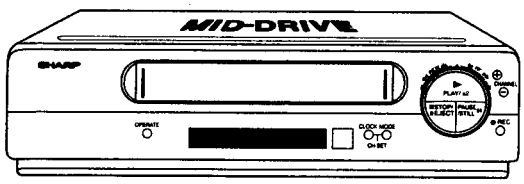
VC-MA40B
VC-MA48D

SERVICE MANUAL
维修手册

SHARP

S64U4VC-MA40B

VHS VIDEO CASSETTE RECORDER
VHS 盒式磁带录象机



MODELS 型 号

VC-MA40B
VC-MA48D

In the interests of user-safety (Required by safety regulations in some countries) the set should be restored to its original condition and only parts identical to those specified should be used.

为了使用者的安全（有些国家用安全规定加以要求），修理本装置时必须完全保持其原有配件状态，更换只得使用规定者。

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SHARP CORPORATION

PRECAUTIONS IN PART REPLACEMENT

When servicing the unit with power on, be careful to the section marked white all over.
This is the primary power circuit which is live.

When checking the soldering side in the tape travel mode, make sure first that the tape has been loaded and then turn over the PWB with due care to the primary power circuit.

Make readjustment, if needed after replacement of part, with the mechanism and its PWB in position in the main frame.

(1) Start and end sensors: Q851 and Q852.

Insert the sensor's projection deep into the upper hole of the holder (LHLDZ1893AJ00). Referring to the PWB, fix the sensors tight enough.

(2) Photocoupler RH-FX0005GEZZ: IC901

Refer to the symbol on the PWB and the anode marking of the part.

(3) Cam switches A and B (RH-PX0231GEZZ) : D854 and D855.

Adjust the notch of the part to the white marker of the symbol on the PWB. Do not allow any looseness.

(4) Take-up and supply sensors (RH-PX0232GEZZ): D857 and D856.

Be careful not to confuse the setting direction of the parts in reference to the symbols on the PWB. Do not allow any looseness.

(5) Diode bridge (RH-DX0083GEZZ):D901.

Adjust the + marking of the part to the symbol's cathode marking on the PWB.

零件更换时的注意事项

在需要对本录象机进行带电保养检查时，对所有注有白色标记的部分均应特加小心注意。
注有白色标记的部分为初级电源电路部分。
在进行走带状况检查调整过程中检查印刷电路板焊线面时，应先确认磁带的装挂状态符合要求，再边注意初级电源电路边翻转其印刷电路板进行检查。
如更换了零件，将盒室机构及其印刷电路板安置就位后，重新进行调整。

(1)带头、带尾感应器：Q851、Q852
将两感应器的凸销分别深插于插座(LHLDZ1893AJ00) 上面插孔之中，并相对于盒室机构分别将其紧固之。

(2)光电耦合器(RH-FX0005GEZZ)：IC901
参照盒室机构印刷电路板以及该部件阳极端的标记。

(3)凸轮开关A和B (RH-PX0231GEZZ)：D854和D855
调该部件的槽口部于盒室机构印刷电路板的白色标记处。扣紧之，切勿让其产生任何松动。

(4)卷带盘、供带盘感应器(RH-PX0232GEZZ)：D857和D856
参照盒室机构印刷电路板上的所有标记，切勿混淆这两个感应器的设定方向。扣紧之，切勿让其产生任何松动。

(5)二极管电桥(RH-DX0083GEZZ)：D901
调该零件的＋标记于盒室机构印刷电路板上的阴极处。

1. SPECIFICATIONS

Format:	VHS PAL standard
Video recording system:	Two rotary head helical scan system
Video signal:	PAL/SECAM colour and B/G signals, 625 lines
Recording playing time:	240 min. max. with SHARP E - 240 tape (PAL/SECAM: SP mode) 480 min. max. with SHARP E-240 tape (PAL/SECAM: LP mode) 160 min. max. with SHARP T-160 tape (NTSC: SP mode Playback) 480 min. max. with SHARP T-160 tape (NTSC: EP mode Playback)
Tape width:	12.7 mm
Tape speed:	23.39 mm/s (PAL/SECAM: SP mode) 11.70 mm/s (PAL/SECAM: LP Mode) 33.35 mm/s (NTSC: SP mode Playback) 11.12 mm/s (NTSC: EP mode Playback)
Antenna:	75 ohm unbalanced
Receiving channel:	VHF Channel E2 - E12, S1 - S20 (VC-MA40B) VHF Channel C1 - C12 (VC-MA48D) UHF Channel E21 - E69 (VC-MA40B) UHF Channel C13 - C57 (VC-MA48D)
RF converter output signal:	UHF Channel E31 - E40 Preset to E36 (VC-MA40B) UHF Channel C22 - C26 Preset to C25 (VC-MA48D)
Power requirement:	AC 220V, 50/60 Hz
Power consumption:	Approx. 17W (220V/50Hz)
Operating temperture:	5°C to 40°C
Storage temperature:	– 20°C to 60°C
Weight:	3.8kg
Dimensions:	380 mm (W) x 290.5 mm (D) x 93 mm (H)
Video	
Input:	1.0 Vp-p, 75 ohm
Output:	1.0 Vp-p, 75 ohm
Audio	0 dBs = 0.775 Vrms
Input:	Line: – 8 dBs, more than 47k ohm
Output:	Line: – 8 dBs, less than 1k ohm
Accessories included:	75 ohm coaxial cable Operation Manual Infrared remote control Battery

As part of our policy of continuous improvement, we reserve the right to alter design and specifications without notice.

Note: The antenna must correspond to the new standard DIN 45325 (IEC 169 - 2) for combined UHF/VHF antenna with 75 ohm connector.

1．规　　格

形　式：	VHS（家庭用录象机）PAL标准型
视频记录方式：	双旋转磁头螺旋形扫描方式
视频信号：	PAL/SECAM彩色及黑白信号，625扫描线
记录再现时间：	PAL/SECAM制式再现：夏普E-240录象磁带最大240分钟SP转速
	夏普E-240录象磁带最大480分钟LP转速
	NTSC制式再现　　：夏普T-160录象磁带最大160分钟SP转速
	夏普T-160录象磁带最大480分钟EP转速
录象磁带带宽：	12.7毫米
走带速度：	PAL/SECAM制式再现：23.39毫米/秒(SP方式)
	：11.70毫米/秒(LP方式)
	NTSC制式再现　　：33.35毫米/秒(SP方式)
	：11.12毫米/秒(EP方式)
天　线：	75欧姆，非平衡式
接收频道：	VHF（甚高频）频道E2-E12,S1-S20(型号VC-MA40B)
	VHF（甚高频）频道C1-C12(型号VC-MA48D)
	UHF（超高频）频道E21-E69(型号VC-MA40B)
	UHF（超高频）频道C13-C57(型号VC-MA48D)
射频变换器输出信号：	UHF（超高频）频道E31-E40,出厂预设为频道E36(型号VC-MA40B)
	UHF（超高频）频道C22-C26,出厂预设为频道C25(型号VC-MA48D)
电　源：	交流220伏，50/60赫兹
消耗功率：	约17瓦(交流220伏、50赫兹)
工作温度：	5℃～40℃
存放温度：	-20℃～60℃
重　量：	3.8公斤
尺　寸：	380(宽)×290.5(深)×93(高)毫米
视频信号	
输　入：	1.0Vp-p,75欧姆
输　出：	1.0Vp-p,75欧姆
音频信号	0分贝＝0.775伏均方根值
输入：	线路输入：-8分贝，47千欧姆以上
输出：	线路输出：-8分贝，1千欧姆以下
附属品：	天线用75欧姆同轴联接电缆（带插头）
	使用说明书
	红外线遥控器
	电池

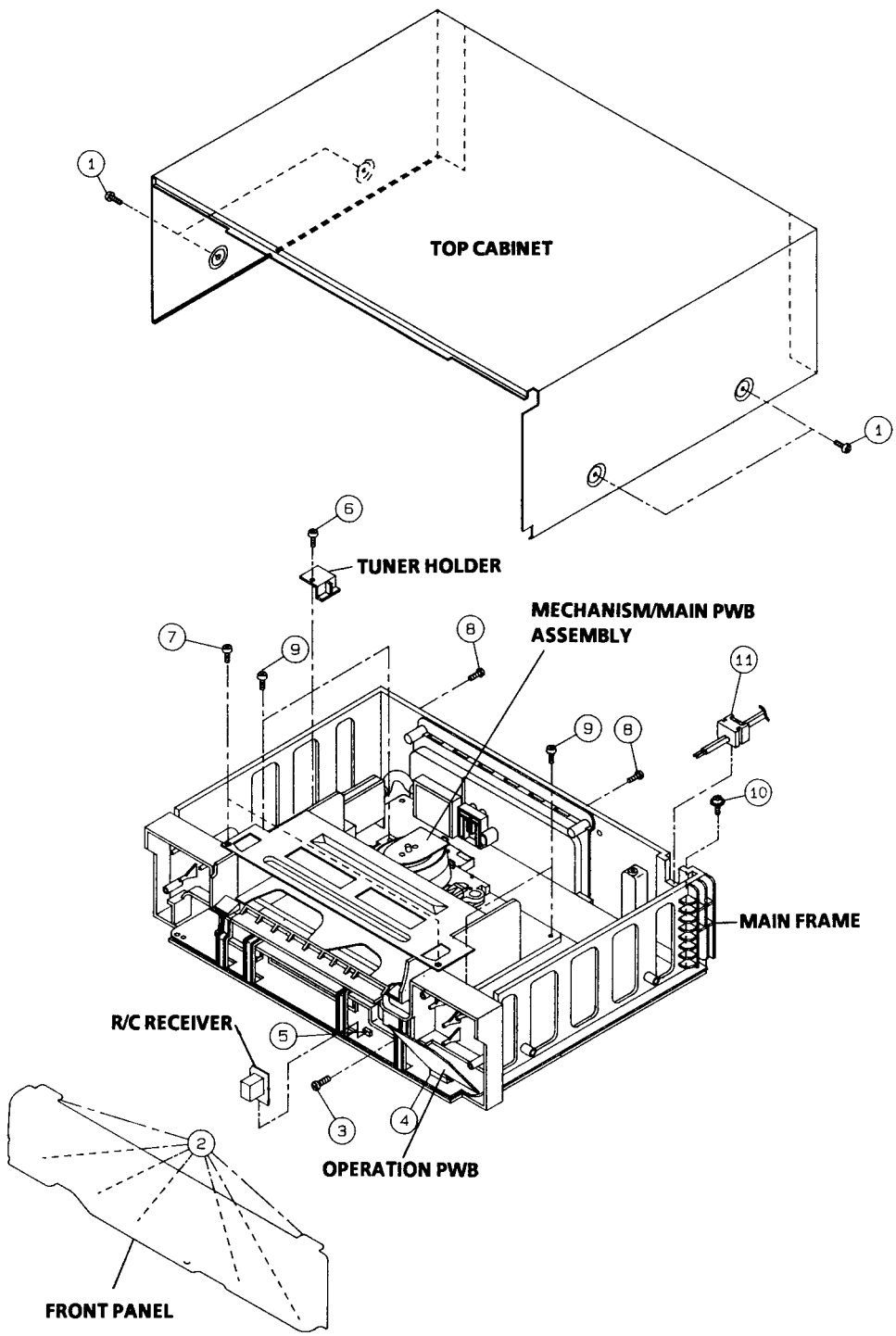
由于产品不断更新换代,有不经预告而改变设计及其规格的情况。

注：天线应使用符合DIN45325(IEC169-2)新标准的带有75欧姆连接器的UHF/VHF型天线。

2. DISASSEMBLY AND REASSEMBLY

2-1 DISASSEMBLY OF MAJOR BLOCKS

TOP CABINET	: Remove 4 screws ①.
FRONT PANEL	: Remove 7 clips ②.
OPERATION PWB	: Remove 1 screw ③. Tilt the PWB by 45° and take it out of the socket ④.
R/C RECEIVER	: Take it out of the socket ⑤.
TUNER HOLDER	: Remove1 screw ⑤.
TUNER HOLDER	: Remove 1screw.⑥.
MECHANISM/ MAIN PWB ASSEMBLY	: Remove 2 screws ⑦, 2 screws ⑧, 4 screws ⑨, 1 screw ⑩ and 1 grommet ⑪. Lift the rear end of the mechanism/main PWB assembly and take it out of the main frame.



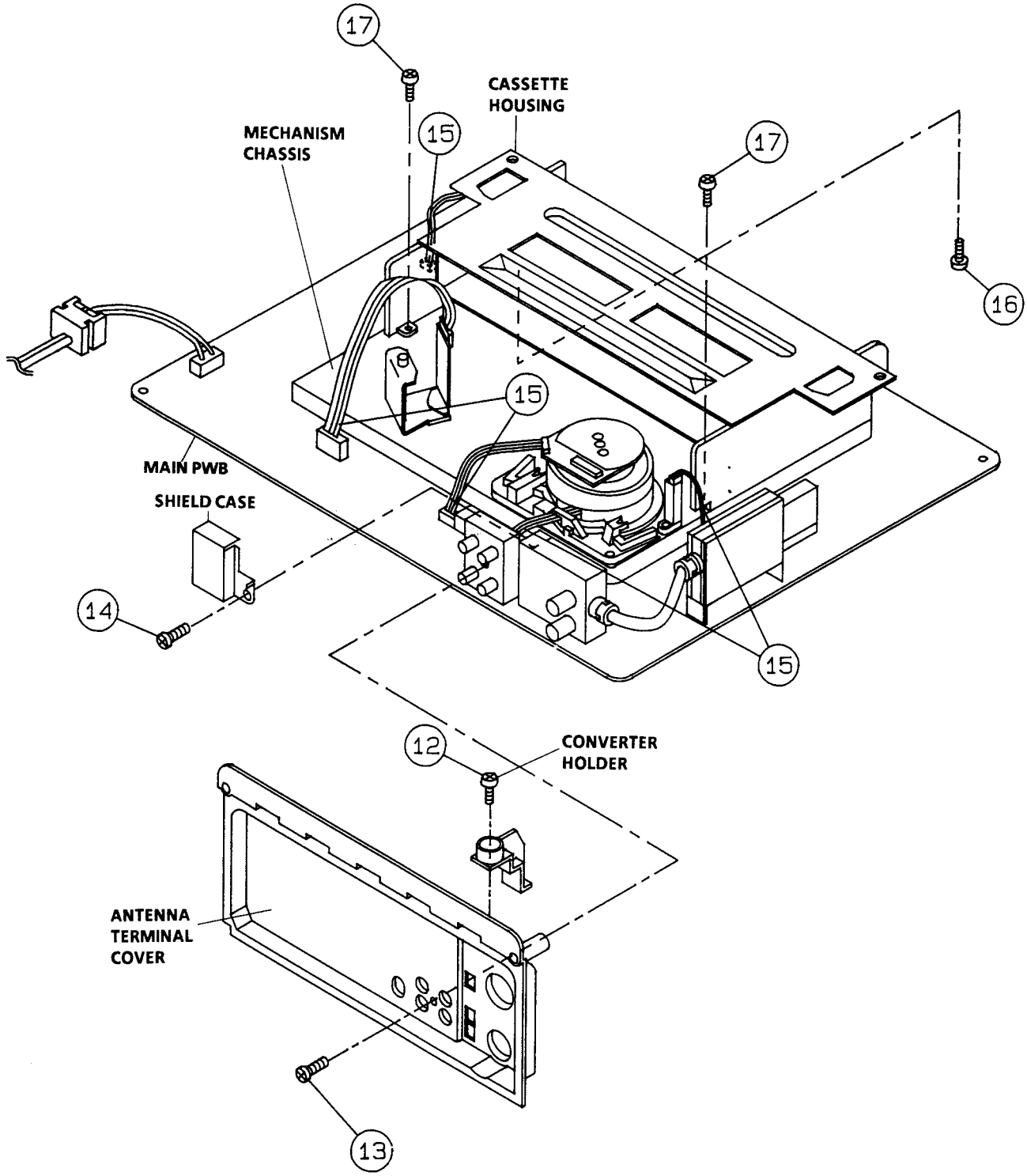
2-2 DISASSEMBLING THE MECHANISM/MAIN PWB ASSEMBLY

CONVERTER HOLDER : Remove 1 screw ⑫

ANTENNA TERMINAL COVER : Remove 1 screw ⑬.

MECHANISM CHASSIS/ CASSETTE HOUSING ASSEMBLY : Remove 1 screw ⑭ and shield case.
Remove 3 FFCs and 2 harnesses ⑮.
Be carefull not to confuse the top and bottom of the FFC.
Remove 1 screw ⑯.
Remove the mechanism assembly straight up from the main PWB with care not to damage their surrounding parts.

CASSETTE HOUSING : Remove 2 screws ⑰.



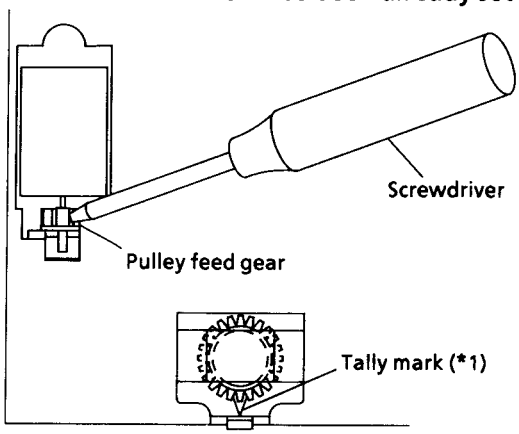
2-3 PRECAUTIONS IN REASSEMBLING

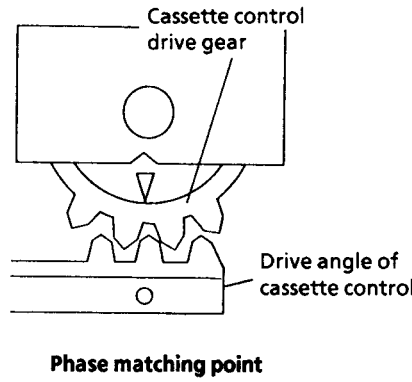
MOUNTING THE CASSETTE CONTROLLER

Initial setting is indispensable before placing the cassette controller in the mechanism. The initial setting is made in two ways; electrical and mechanical.

Electrical setting:

Making a short-circuit between TP5001 (or jumper pin 241) and TP5002 (or jumper pin 242), both located at the left on your side on the main PWB, with a 22 ohm resistor and be sure that the mechanism is back to its initial setting position (*1). Now place the cassette controller in position. (This method is used when the mechanism has been already set on its PWB.)





Mechanical setting:

Turn the loading motor's pulley feed gear using a screwdriver and be sure that the mechanism is back to its initial setting position (*1). Now place the cassette controller in position. (This method is applicable for the mechanism alone.)

COUPLING THE MECHANISM TO THE PWB

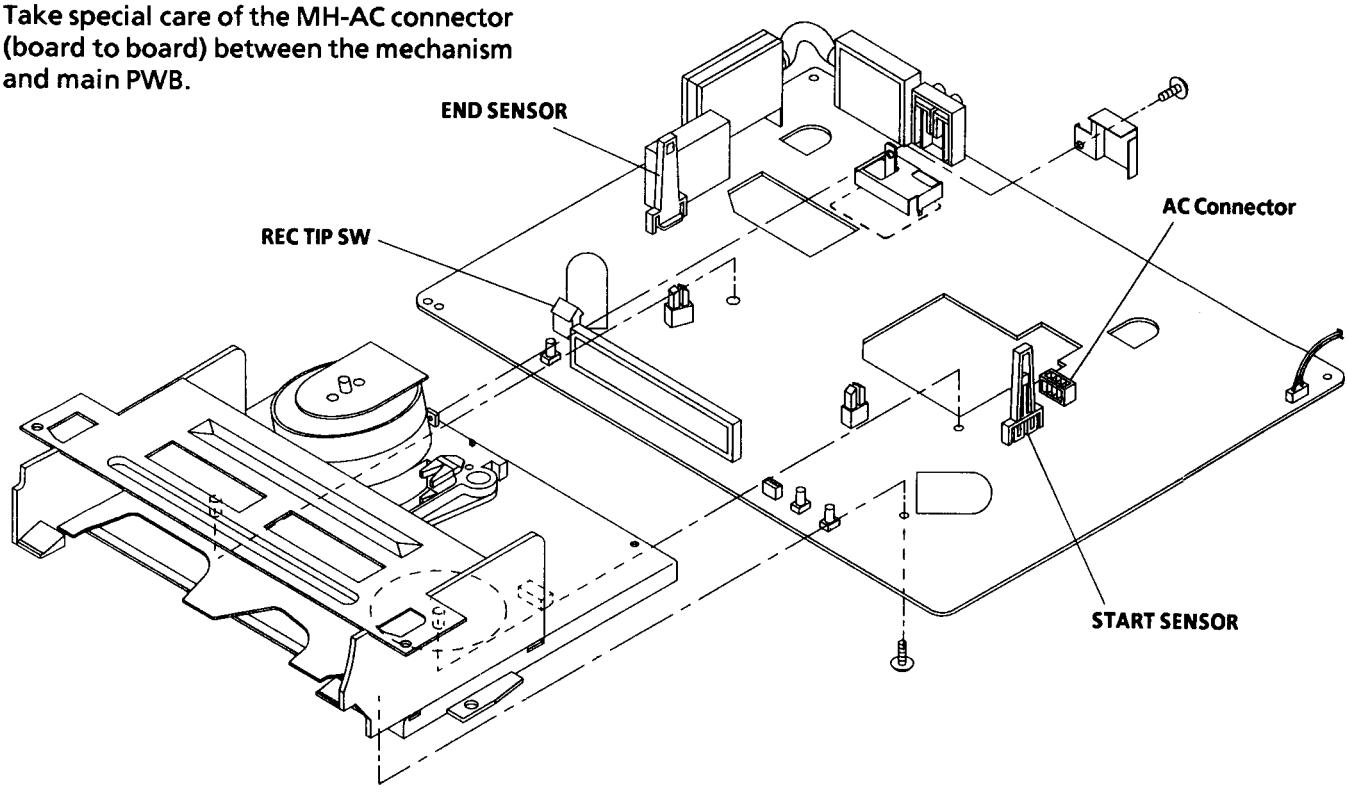
Match the mechanism's projections with the two symbols (round reference and oval sub-reference) on the main PWB. Place the mechanism straight down in position with due care so that the mechanism chassis's outer edges should not damage any parts nearby.

Tighten up the two screws (one for fixing the mechanism and the head amplifier shield, the other on the main PWB's soldering side and located near the loading motor) to fix the mechanism and main PWB. Reconnect the FFC cables (AA, AD and AH) and harnesses (AE and AL) between the mechanism and main PWB.

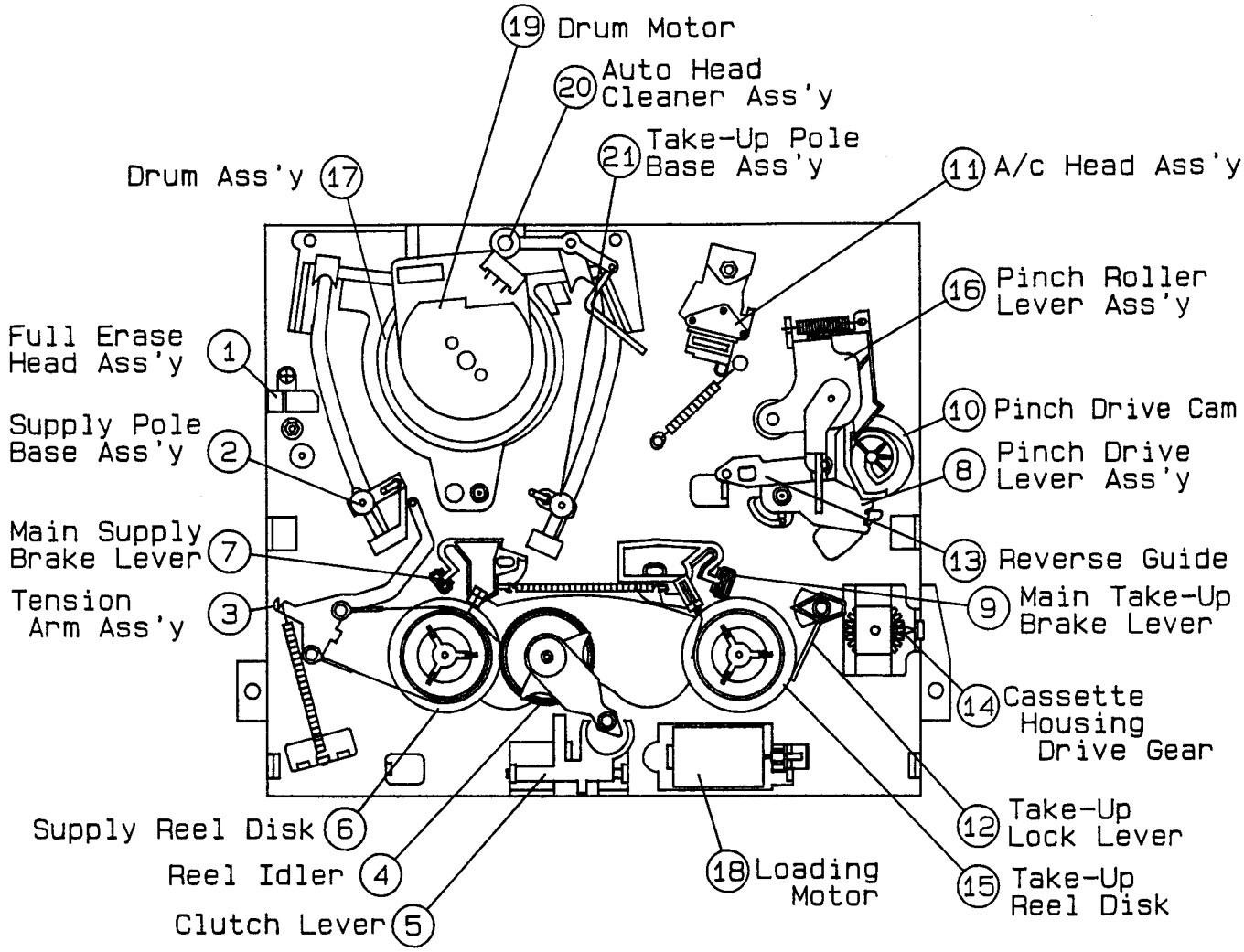
Parts to pay attention to:

Start and end sensors Q851, Q852
Record tip switch S851

Take special care of the MH-AC connector (board to board) between the mechanism and main PWB.

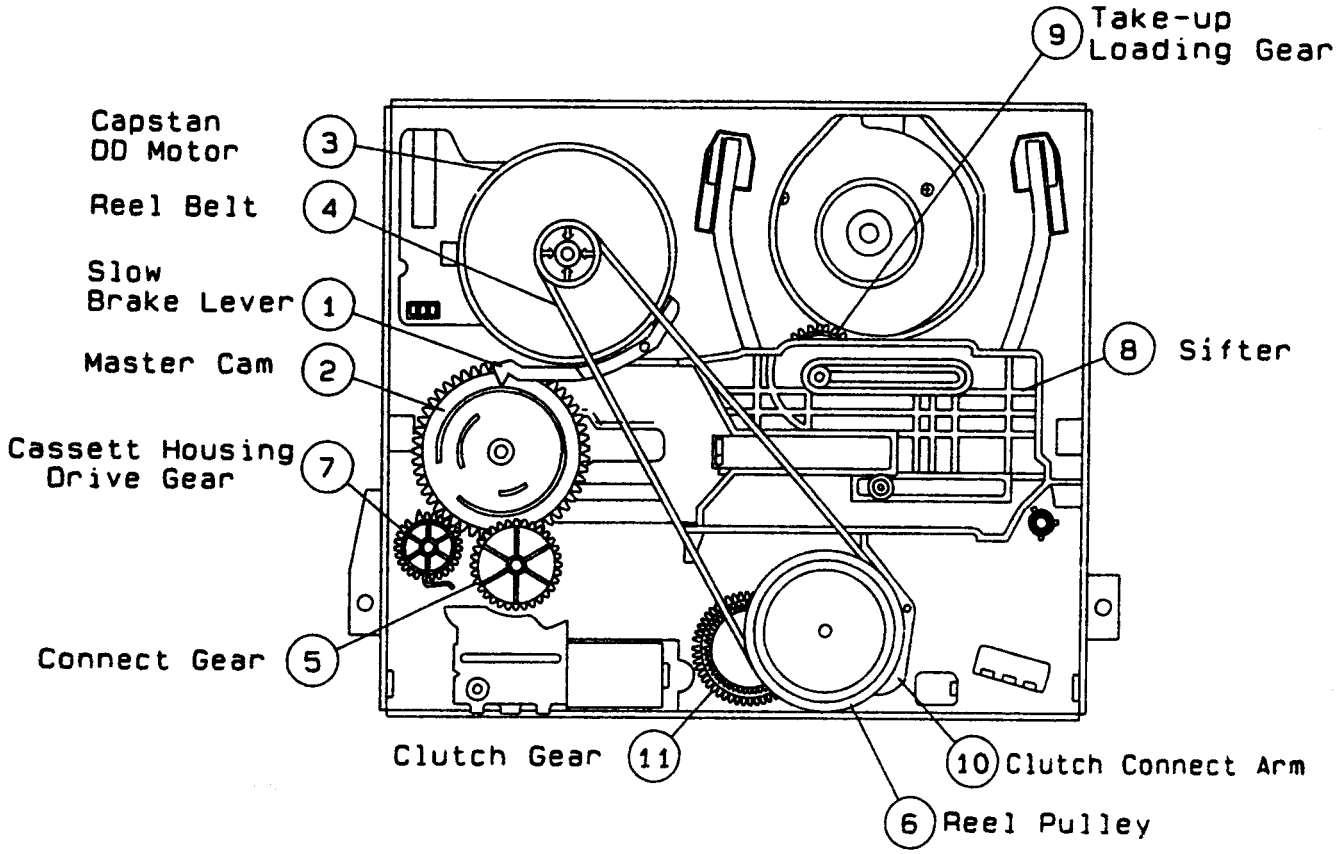


3. FUNCTION OF MAJOR MECHANICAL PARTS (TOP VIEW)


19 Drum Motor
20 Auto Head Cleaner Ass'y
21 Take-Up Pole Base Ass'y
Drum Ass'y 17
11 A/c Head Ass'y
16 Pinch Roller Lever Ass'y
Full Erase Head Ass'y 1
Supply Pole Base Ass'y 2
10 Pinch Drive Cam
8 Pinch Drive Lever Ass'y
Main Supply Brake Lever 7
Tension Arm Ass'y 3
13 Reverse Guide
9 Main Take-Up Brake Lever
14 Cassette Housing Drive Gear
12 Take-Up Lock Lever
Supply Reel Disk 6
Reel Idler 4
Clutch Lever 5
18 Loading Motor
15 Take-Up Reel Disk

No.	Function	No.	Function
1.	Full erase head ass'y Erase the whole records on the tape in the recording mode.	13.	Reverse guide Pulls out the tape and controls the tape drive train height with the upper and lower guides.
3.	Tension arm ass'y Detects the tension of tape while running, and brakes the supply reel disk via the tension band.	16.	Pinch roller lever ass'y Press-fits the tape to the capstan during tape running. The right protrusion switches the clutch of the cassette housing control assembly in "tape eject", and makes the mechanism eject the tape.
7.	Main supply brake lever Brakes the supply reel disk to prevent tape slackening when the unit is stopped in fast forward or rewind mode.	18.	Loading motor A motive power which drives the mechanism. It transmits the power to the master cam and cassette housing control assembly.
9.	Main take-up brake lever Brakes the take-up reel disk to prevent tape slackening when the unit is stopped in fast forward or rewind mode.		

FUNCTION OF MAJOR MECHANICAL PARTS (BOTTOM VIEW)



No.	Function	No.	Function
1.	Slow brake lever Gets in contact with the capstan D.D. motor linking to the master cam in the slow still mode, and brakes it to a certain degree.	6.	Reel pulley Transmits the power of the capstan D.D. motor to the reel disk via the reel idler.
3.	Capstan D.D. motor A motive power which runs the tape. It transmits the power via the reel belt.	8.	Shifter Transmits the operation of the master cam to break and loading gear.
4.	Reel belt Transmits the power to run the tape to the reel pulley.	9.	Take-up loading gear Shifts the take-up pole base and guide roller via the loading relay gear, and applies the tape around the drum assembly, as well as transmits the power to the supply loading gear.

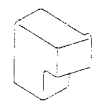
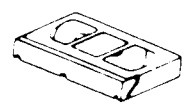
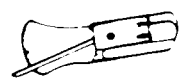
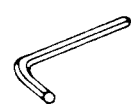
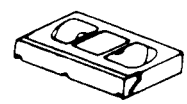
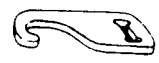
4. ADJUSTMENT, REPLACEMENT AND ASSEMBLY OF MECHANICAL UNITS

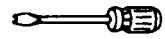
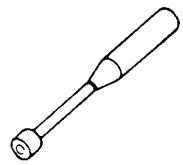
Here we will describe a relatively simple service work in the field, not referring to the more complicated repairs which would require the use of special equipment and tools (drum assembly replacement, for example).

We are sure that the easy-to-handle tools listed below would be more than handy for periodical maintenance to keep the machine in its original working condition.

TOOLS NECESSARY FOR ADJUSTING THE MECHANICAL UNITS

The following tools are required for proper service and satisfactory repair.

No.	Jig Item	Part No.	Code	Configuration	Remarks
1	Reel Disk Height Adjusting Jig	JiGRH0002	BR		These Jigs are used for checking and adjusting the reel disk height.
2	Master Plane Jig	JiGMP0001	BY		
3	A/C Head Tilt Adjusting Jig	JiGACH-A323U	BX		This Jig is used for setting the A/C head tilt.
4	Torque Gauge (90g)	JiGTG0090	CM		These Jigs are used for checking and adjusting the torque of take-up and supply reel disks.
	Torque Gauge (1.2 kg)	JiGTG1200	CN		
5	Gauge Head	JiGTH0006	AW		
6	Cassette Torque Meter	JiGVHT-063	CZ		This cassette torque meter is used for checking and adjusting the torque of take-up for measuring tape back tension.
7	Tension Gauge (300g)	JiGSG0300	BF		There are two gauges used for the tension measurements, 300 g and 2.0 kg.
	Tension Gauge (2.0kg)	JiGSG2000	BS		
8	Hex Wrench (0.9mm)	JiGHW0009	AE		These Jigs are used for loosening or tightening special hexagon type screws.
	Hex Wrench (1.2mm)	JiGHW0012	AE		
	Hex Wrench (1.5mm)	JiGHW0015	AE		
9	Alignment Tape (PAL)	VR0CPSV	CK		This tape is especially used for electrical fine adjustment.
11	Tension Gauge Adapter	JiGADP003	BK		This Jig is used with the tension gauge. Rotary transformer clearance adjusting jig.

No.	Jig Item	Part No.	Code	Configuration	Remarks
12	Special Bladed Screwdriver	JiGDRiVERH-4	AP		This screwdriver is used for adjusting the guide roller height.
14	Torque Driver	JiGTD1200	CB		This is used to screw down resin-made parts: the specified torque is 5 kg.
14	Box Driver	JiGDRiVER110-7	AS		This Jig is used for height adjustment of the A/C head and X-position.
		JiGDRiVER110-4	AV		This Jig is used for replacement of the SI roller.
17	Reverse Guide Height Adjusting Jig	JIGRVGH-F18	BU		This Jig is used for height adjustment of the reverse guide.

MECHANICAL PARTS REQUIRING PERIODICAL INSPECTION

Use the following table as a guide to maintain the mechanical parts in good operating condition.

Parts \ Maintained	500 hrs.	1000 hrs.	1500 hrs.	2000 hrs.	Possible symptom encountered	Remarks
Guide roller ass'y	□	□	□	○	Lateral noises Head occasionally blocked	Abnormal rotation or significant vibration requires replacement.
Supply impedance roller	□	□	□	○		
Supply impedance roller (inner hole and shaft)		□		□		Clean with pure high quality isopropyl alcohol.
Supply impedance roller flange	□	□	□	□		Clean tape contact part with the specified cleaning liquid.
Retaining guide	□	□	□	□		
Slant pole	□	□	□	○		
Video head (upper drum ass'y)	□	○□	□	○□	Poor S/N ratio, no colour	Clean tape contact area with the specified cleaning liquid.
Full-erase head	□	□	□	○	Poor colour, beating	
A/C head	□	□	□	○	Sound too small or distorted	
Lower drum ass'y	□	□	□	○	Poor flatness of the envelope with alignment tape	
Capstan D.D. Motor	□	□	□	○	No tape running, uneven colour	
Pinch roller	□	□	□	○	No tape running, tape slack	Clean rubber and rubber contact area with the specified cleaning liquid.
Reel belt		□		○	No tape running, tape slack, no fast forward/rewind motion	
Tension band ass'y				○	Cassette not loaded or unloaded	
Loading Motor				○		
Reel idler ass'y				○	No tape running	
Reel pully ass'y		□△		□○		
Clutch gear ass'y				○		
Main supply/take-up brake levers				○	Tape slack	
AHC (Automatic Head Cleaner)		○		○		Replace the roller of the cleaner when it wears down. Just change the AHC roller assembly for new one.

NOTE: ○: Part replacement.
□: Cleaning (For cleaning, use a lint-free cloth dampened with pure isopropyl alcohol).
△: Oil refilling (The indicated point should be lubricated with high quality spindle oil every 1000 hrs).

If the reading is out of the specified value, clean or replace the part.

REMOVAL AND REASSEMBLY OF CASSETTE HOUSING CONTROL ASSEMBLY

- **Removal**

1. Set the cassette ejected condition in the cassette eject mode.
2. Unplug the recorder from the main source.
3. Follow the procedures below in the specified order.
   a) Remove the cassette housing installation screws ① and ②.
   b) Slide and pull out the cassette housing control assembly upward.

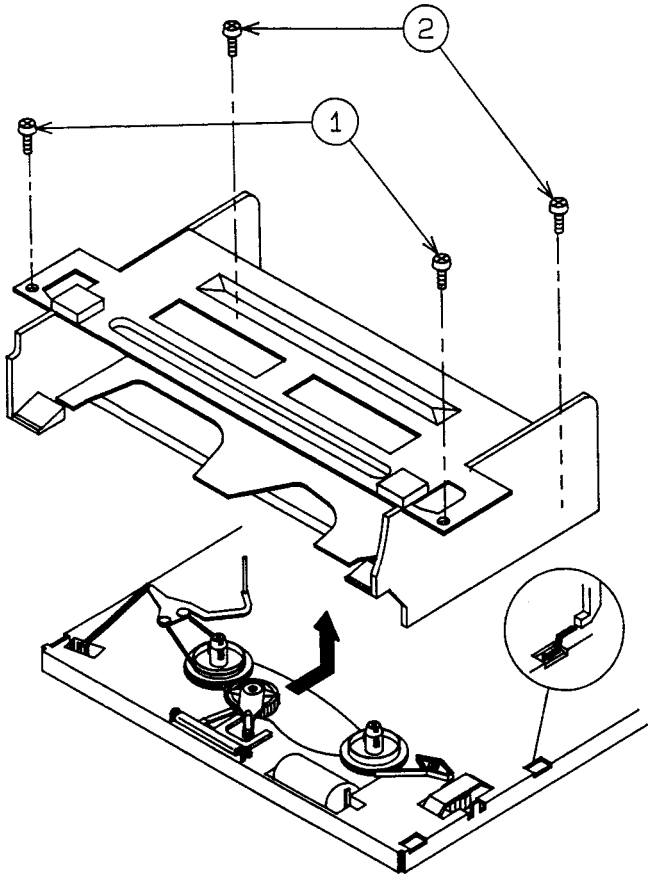


Figure 4-1.

- **Reassembly**

1. Before installation of the cassette housing control assembly, make a short-circuit between TP5001 (or jumper pin 241) and TP5002 (or jumper pin 242), both located at the left on your side on the main PWB, with a 22 ohm resistor. Plug in the power cord. The cassette control drive gear starts and stops just when a tally mark appears in the mechanism chassis window. Align this tally mark with the cassette control drive angle's mark, as shown in Fig. 4-2, to position the cassette control on the mechanism chassis.

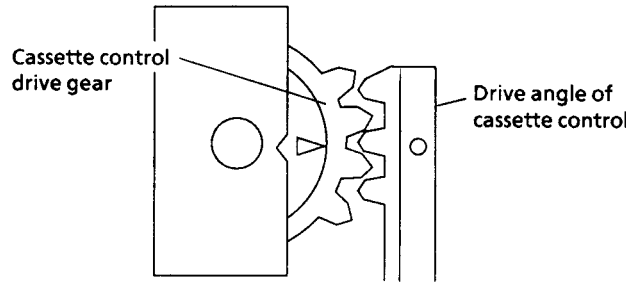


Figure 4-2.

2. Follow the procedures for removal in the reverse order.

Notes:

① In using a magnet screw driver, be sure to keep it away from the A/C head, FE (Full Erase) head, or the drum.

② In removal and reassembly, take care not to hit the cassette housing control assembly or tools against the guide pin, drum, or the like thereabout.

③ Load the cassette once onto the cassette housing control assembly after reassembly.

TO RUN A TAPE WITHOUT THE CASSETTE HOUSING CONTROL ASSEMBLY

1. Be sure to make a short-circuit between TP5001 (or jumper pin 241) and TP5002 (or jumper pin 242), both located at the left on your side on the main PWB, with a 22 ohm resistor, before turning on the power.
2. Plug in the power cord.
3. Turn on the power switch.
4. Open the lid of a cassette tape by hand.
5. Hold the lid with two pieces of vinyl tape.
6. Set the cassette tape in the mechanism chassis.
7. Stabilize the cassette tape with a weight (500g) to prevent floating.
8. Perform running test.

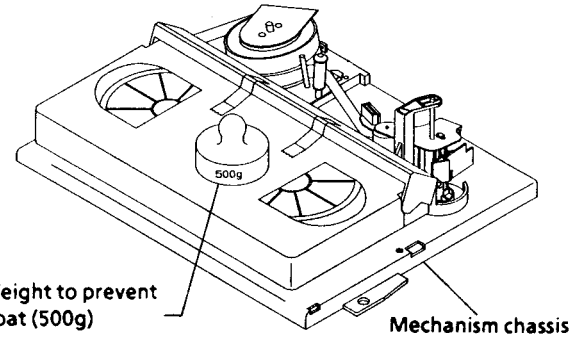


Figure 4-3.

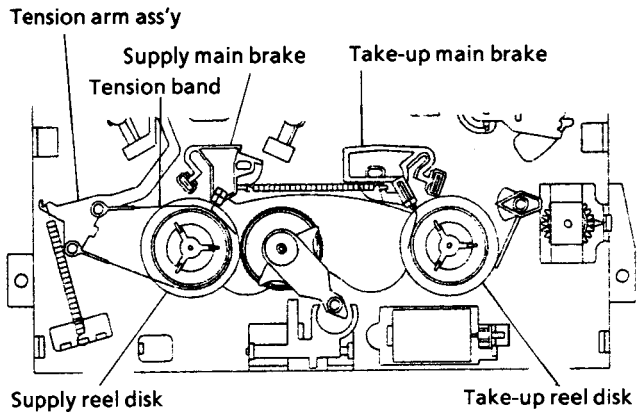
Note:

The weight should not be more than 500g.

REPLACEMENT AND HEIGHT CHECKING AND ADJUSTMENT OF REEL DISKS

- **Removal (Supply and Take-up reel disks)**

1. Remove the cassette housing control assembly.
2. Pull the tension band out of the tension arm.
3. Remove the supply main brake and the take-up main brake.
4. Open the hook at the top of the reel disk, and remove the reel disk.



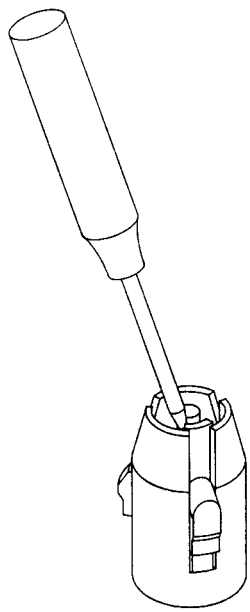


Figure 4-4.

Note:
When the tension band is pressed in the direction of the arrow for removal, the catch is hard to be deformed.

Figure 4-5.

- **Reassembly (Supply reel disk)**

1. Clean the reel disk shaft and apply oil to it.
2. Install a new supply reel disk onto the shaft.
3. Replace the tension band around the supply reel disk, and insert it to the hole of the tension arm.
4. Check the reel disk height and reassemble the supply main brake.

Notes:
① Take enough care not to deform the tension band during installation of the supply reel disk.
② Be careful not to damage the supply main brake.

- **Reassembly (Take-up reel disk)**

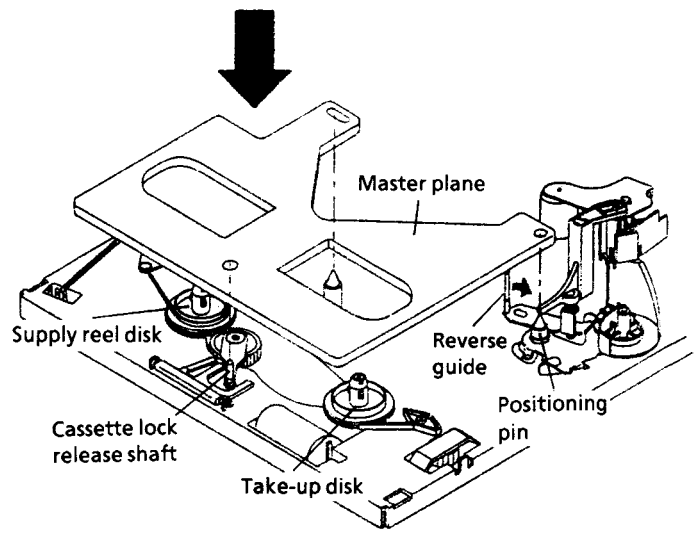
1. Clean the reel disk shaft and apply oil to it.
2. Install a new take-up reel disk onto the shaft.
3. Check the reel disk height and reassemble the take-up main brake.

Note:
Take care not to damage the take-up main brake.

* After reassembly, check the video search rewind back tension (see page 18), and check the brake torque (see page 21).

- **Height checking and adjustment**

Note:
Place the master plane onto the mechanism unit, taking care not to hit the drum (see Figure 4-6).



Set the master plane releasing the reverse guide by a finger.

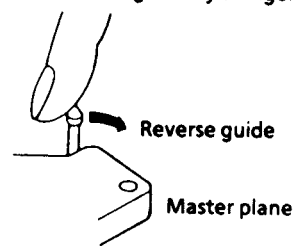


Figure 4-6.

- Check that the reel disk is lower than part A but higher than part B. If the height is not correct, readjust the reel disk height by changing the poly-slider washer under the reel disk.

Note:
Whenever replacing the reel disk, perform the height checking and adjustment.

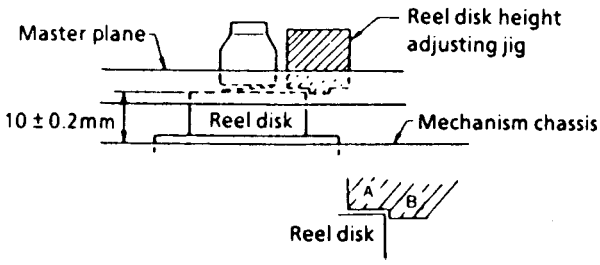


Figure 4-7.

CHECKING AND ADJUSTMENT OF TAKE-UP TORQUE IN FAST FORWARD MODE

- **Remove the cassette housing control assembly.**

- **Make a short-circuit between TP5001 (or jumper pin 241) and TP5002 (or jumper pin 242), both located at the left on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.**

- **Setting**

1. Set a torque gauge to zero on the scale. Place it on the take-up reel disk.
2. Press the FF button to set the mechanism to the fast forward mode.

- **Checking**

1. Turn the torque gauge slowly (one rotation every 2 to 3 seconds) by hand in the take-up direction.
2. Check to see if the take-up torque is higher than 69 mN·m (700 gf·cm).

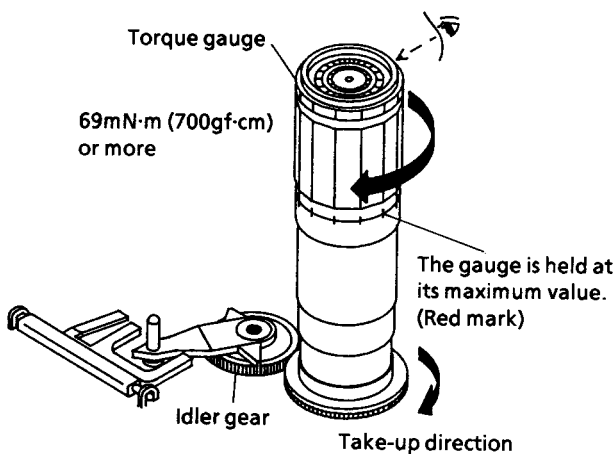


Figure 4-8.

- **Adjustment**

1. If the take-up torque is outside the range, clean the capstan D.D. motor pulley, reel belt and reel pulley with cleaning liquid, then recheck the torque.
2. If the take-up torque is still out of range, replace the reel belt.

Notes:
1. Hold down the torque gauge so that it may not fly off.
2. When checking the take-up torque, do not keep the reel disk locked for a longer time.

CHECKING AND ADJUSTMENT OF TAKE-UP TORQUE IN REWIND MODE

- **Remove the cassette housing control assembly.**

- **Make a short-circuit between TP5001 (or jumper pin 241) and TP5002 (or jumper pin 242), both located at the left on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.**

- **Setting**

1. Set a torque gauge to zero on the scale. Place it on the supply reel disk.
2. Press the REW button to set the mechanism to the rewind mode.

- **Checking**

1. Turn the torque gauge slowly (one rotation every 2 to 3 seconds) by hand in the take-up direction.
2. Check to see if the take-up torque is higher than 69 mN·m (700 gf·cm).

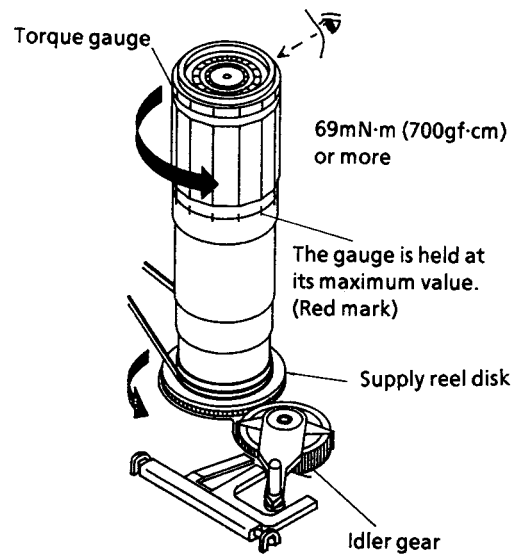


Figure 4-9.

- Adjustment

1. If the take-up torque is outside the range, clean the capstan D.D. motor pulley, reel belt and reel pulley with cleaning liquid, then recheck the torque.
2. If the take-up torque is still out of range, replace the reel belt.

Notes:

1. Hold down the torque gauge so that it may not fly off.
2. When checking the take-up torque, do not keep the reel disk locked for a longer time.

CHECKING AND ADJUSTMENT OF TAKE-UP TORQUE IN PLAYBACK MODE

1. Remove the cassette housing control assembly.
2. Make a short-circuit between TP5001 (or jumper pin 241) and TP5002 (or jumper pin 242), both located at the left on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.
3. Open the lid of the cassette torque meter, and hold it with two pieces of vinyl tapes.
4. Load the cassette torque meter into the unit.
5. Put the weight (500g) on the cassette torque meter.
6. Press the REC button to put the unit in REC mode.

Set value SP 8.8 ± 3.8mN·m (90 ± 39gf·cm)

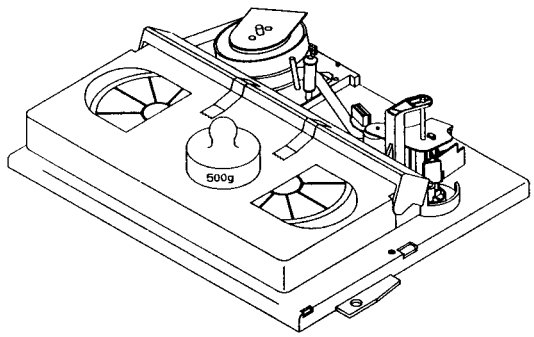


Figure 4-10.

- Checking

1. Check that the torque is in the range of 8.8 ± 3.8mN·m (90 ± 39gf·cm).
2. The torque fluctuates due to the rotational deviation of the reel pulley ass'y. Use the center of the fluctuation as the value.
3. Place the ass'y in the SP record mode, and check that the take-up torque is within the range.

- Adjustment

If the take-up torque in the playback mode is outside the range, replace the reel pulley ass'y.

Note:

Stabilize the cassette torque meter to prevent floating.

CHECKING AND ADJUSTMENT OF TAKE-UP TORQUE IN VIDEO SEARCH REWIND MODE

- **Remove the cassette housing control assembly.**

- **Make a short-circuit between TP5001 (or jumper pin 241) and TP5002 (or jumper pin 242), both located at the left on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.**

- Setting

1. Push the PLAY button to place the ass'y in the playback mode.
2. Push the REW button to place the ass'y in the video search rewind mode.

- Checking

1. Place the torque gauge on the supply reel disk, and turn it counterclockwise very slowly (one rotation every 1 to 2 seconds) and check that the torque is within the set value 14.5 $^{+8}_{-6}$ mN·m (148 $^{+80}_{-60}$ gf·cm)

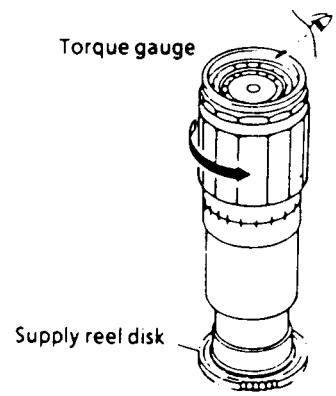


Figure 4-11.

Note:

Set the torque gauge securely on the supply reel disk. If it is not secure, the measurement will be incorrect.

- Adjustment

If the take-up torque in video search rewind mode is outside the range, replace the reel pulley ass'y.

Note:

The torque fluctuates due to the rotational deviation of the reel pulley ass'y. Use the center of the fluctuation at the value.

CHECKING THE FAST FORWARD BACK TENSION

- **Remove the cassette housing control assembly.**
- **Make a short-circuit between TP5001 (or jumper pin 241) and TP5002 (or jumper pin 242), both located at the left on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.**
- **Checking**
  1. Push the FF button to place the ass'y in the fast forward mode.
  2. Place the torque gauge on the supply reel disk, and turn it clockwise very slowly (one rotation every 2 to 3 seconds) and check that the torque is 1.5 ± 0.9mN·m (15 ± 9gf·cm).

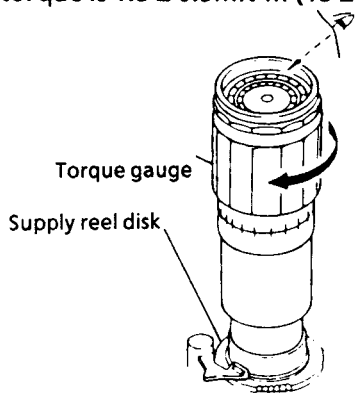


Figure 4-12.

Note:

① Set the torque gauge securely on the supply reel disk. If the torque gauge is not securely set on the reel disk, measurement will be incorrect.

② Measure the torque with the torque gauge's weight exerted on the reel disk.

CHECKING THE REWIND BACK TENSION

- **Remove the cassette housing control assembly.**
- **Make a short-circuit between TP5001 (or jumper pin 241) and TP5002 (or jumper pin 242), both located at the left on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.**
- **Checking**
  1. Push the REW buton to place Place the ass'y in the rewind mode.
  2. Place the torque gauge on the take-up reel disk, and turn it counterclockwise very slowly (one rotation every 2 to 3 seconds) and check that the torque is 1.3 ± 0.8 mN·m (13 ± 8gf·cm).

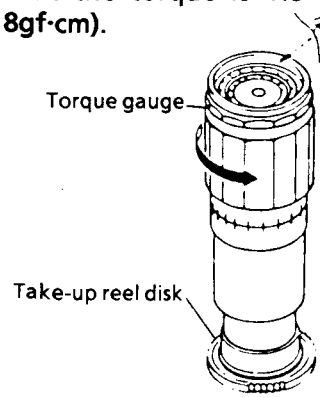


Figure 4-13.

Note:

① Set the torque gauge securely on the take-up reel disk. If it is not secure, the measurement will be incorrect.

② Measure the torque with the torque gauge's weight exerted on the reel disk.

CHECKING THE VIDEO SEARCH REWIND BACK TENSION

- **Remove the cassette housing control assembly.**
- **Make a short-circuit between TP5001 (or jumper pin 241) and TP5002 (or jumper pin 242), both located at the left on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.**
- **Checking**
  1. Push the PLAY button to place the ass'y in the playback mode.
  2. Push the rewind button to place the ass'y in the video search rewind mode.
  3. Place the torque gauge on the take-up reel disk, and turn it counterclockwise very slowly (one rotation every 2 to 3 seconds) and check that the torque is within the set value 4 ± 1.7mN·m (41 ± 17gf·cm).

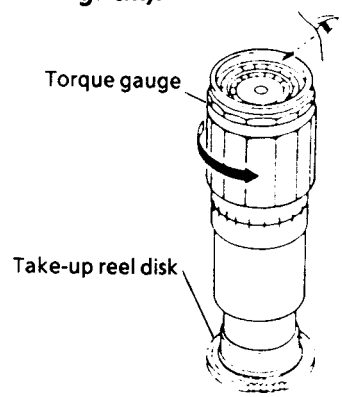


Figure 4-14.

Note:

① Set the torque gauge securely on the take-up reel disk. If it is not secure, the measurement will be incorrect.

② Measure the torque with the torque gauge's weight not exerted on the reel disk.

CHECKING THE PINCH ROLLER PRESSURE

- **Remove the cassette housing control assembly.**
- **Make a short-circuit between TP5001 (or jumper pin 241) and TP5002 (or jumper pin 242), both located at the left on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.**
- **Checking**

  Push the PLAY button to place the ass'y in the playback mode.

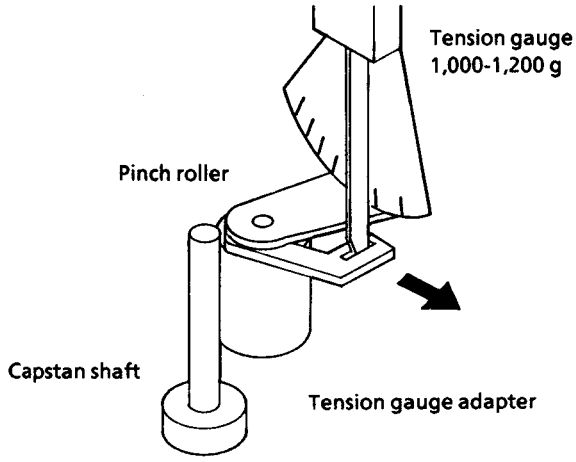


Figure 4-15.

1. Detach the pinch roller from the capstan shaft.
2. Set the tension gauge by hooking the tension gauge adapter onto the pinch roller shaft.
3. Gradually release the pressure to allow the pinch roller to touch the capstan shaft. When the pinch roller just touches the capstan shaft, read the indication on the gauge.
4. Check that the reading of the tension gauge is in the range of 900 to 1200 g.

CHECKING AND ADJUSTMENT OF TENSION POLE POSITION

- **Remove the cassette housing control assembly.**

- **Make a short-circuit between TP5001 (or jumper pin 241) and TP5002 (or jumper pin 242), both located at the left on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.**

- **Setting**

1. Open the lid of cassette tape (E-180), and hold it with two pieces of vinyl tapes.
2. Load the cassette tape into the unit.
3. Put the weight (500g) on the cassette tape.

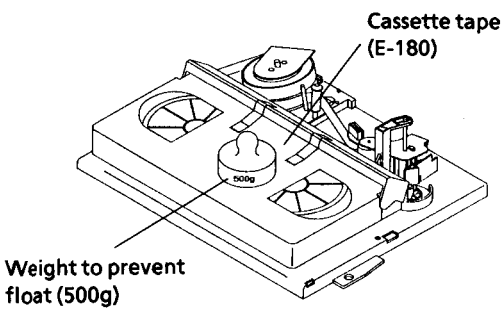


Figure 4-16.

- **Checking**

1. Set a cassette tape, press the REC button and get the tape loaded. Now check the tension pole position.
2. Visually check to see if the left end of the tension pole is in alignment with the line 0.2 mm left of the center line of the SI roller. Readjust as required in the following steps.

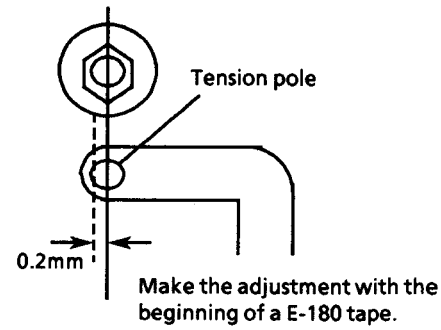


Figure 4-17.

① If the end is at the left from the dotted line:

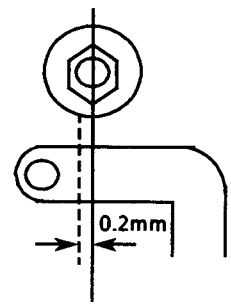


Figure 4-18.

1. Remove the cassette and press the REC button to make an empty loading. Put a bladed screwdriver into the tension band positioning cam and turn it clockwise.
2. Place the cassette in position and check the tension pole position.

② If the end is at the right from the dotted line:

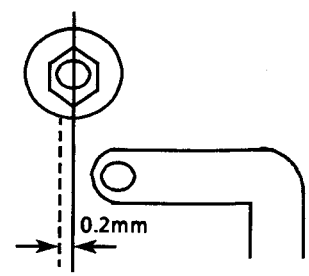


Figure 4-19.

1. Remove the cassette and press the REC button to make an empty loading. Put a bladed screwdriver into the tension band positioning cam to turn it counterclockwise.
2. Place the cassette in position and check the tension pole position.

Note:

① The tension band positioning cam cannot be adjusted with a cassette in place because the cam will be located below the cassette. Repeat a series of steps; empty loading, adjustment, cassette placement and position checking.

② Turn the positioning cam clockwise to move the tension pole to the right (in the black-arrow direction). Turn it counterclockwise to move the tension pole to the left (in the white-arrow direction).

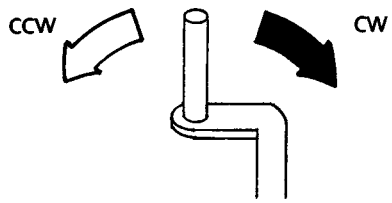


Figure 4-20.

③ Adjustable range of the tension pole positioning cam.

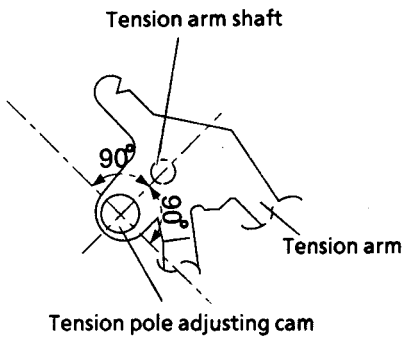


Figure 4-21.

Adjust the tension pole positioning cam so that the arrow mark on the cam be within 90° left and right from the tension arm shaft's center.

CHECKING AND ADJUSTMENT OF RECORD / PLAYBACK BACK TENSION

- **Remove the cassette housing control assembly.**

- **Make a short-circuit between TP5001 (or jumper pin 241) and TP5002 (or jumper pin 242), both located at the left on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.**
- **Setting**

1. Open the lid of the cassette torque meter, and hold it with two pieces of vinyl tapes.
2. Load the cassette torque meter into the unit.
3. Put the weight (500g) on the cassette torque meter.

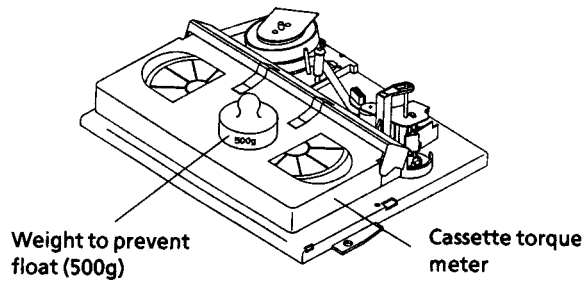


Figure 4-22.

- **Checking**

1. Push the REC button to place the unit in the record mode.
2. Check that the back tension indicated by the gauge is within the set range 31 to 38 g·cm.

Notes:

1. Make sure that the video cassette tape is over the retaining guide.
2. Make sure that the tape is not slack nor damaged at either end.

- **Adjustment**

1. If the reading of the cassette torque meter is less than specified, move the tension spring hook toward A.
2. If the reading of the cassette torque meter is more than specified, move the tension spring hook toward B.

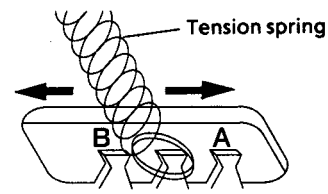
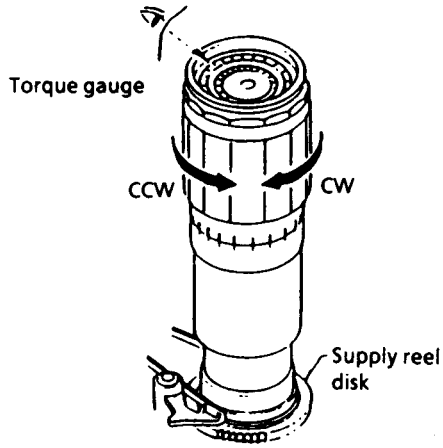


Figure 4-23.

CHECKING THE BRAKE TORQUE

- **Checking the brake torque at the supply side**



CCW:	10 ± 4mN·m (102 ± 41gf·cm)
CW:	35 ± 20mN·m (357 ± 204gf·cm)

Figure 4-24.

- **Remove the cassette housing control assembly.**

- **Make a short-circuit between TP5001 (or jumper pin 241) and TP5002 (or jumper pin 242), both located at the left on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.**

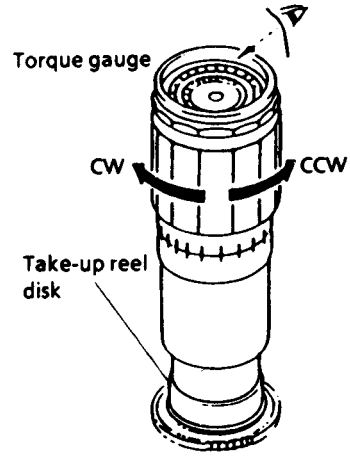
- **Setting**

1. Set a torque gauge to zero on the scale. Place it on the supply reel disk.
2. Switch from the FF mode to the STOP mode.
3. Disconnect the AC power plug.

- **Checking**

1. Slowly rotate the torque gauge in the clockwise (CW) direction and counterclockwise (CCW) direction of the supply brake so that the reel disk and the indicator of the torque gauge rotate at an equal rate. Check that the values are within the range of CW direction = 35 ± 20mN·m (357 ± 204gf·cm), CCW direction = 10 ± 4mN·m (102 ± 41gf·cm), and that the brake torque in the CW direction is at least twice as high as that in the CCW direction.

- **Checking the brake torque at the take-up side**



CCW:	35 ± 20mN·m (357 ± 204gf·cm)
CW:	10 ± 4mN·m (102 ± 41gf·cm)

Figure 4-25.

- **Remove the cassette housing control assembly.**

- **Make a short-circuit between TP5001 (or jumper pin 241) and TP5002 (or jumper pin 242), both located at the left on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.**

- **Setting**

1. Set a torque gauge to zero on the scale. Place it on the take-up reel disk.
2. Switch from the FF mode to the STOP mode.
3. Disconnect the AC power plug.

- **Checking**

1. Slowly rotate the torque gauge in the clockwise (CW) direction and counterclockwise (CCW) direction of the take-up brake so that the reel disk and the indicator of the torque gauge rotate at an equal rate. Check that the values are within the range of CCW direction = 35 ± 20mN·m (357 ± 204gf·cm), CW direction = 10 ± 4mN·m (102 ± 41gf·cm), and that the brake torque in the CCW direction is at least twice as high as that in the CW direction.

- **Adjustment of the brake torque at the supply side and the take-up side**

1. If the supply or take-up brake torque is outside the range, clean the supply or take-up reel disk break lever pad, then recheck the torque.
2. If the supply or take-up brake torque is still outside the range, replace the main brake ass'y or the main brake spring.

Note:
When the main brake is replaced, perform the height checking and adjustment of reel disks (see page 15), and the brake torque checking.

REPLACEMENT OF A/C (Audio/Control) HEAD

1. Remove the cassette housing control assembly.
2. Place the unit in the unloading mode, and unplug the power cord.

- **Removal**

1. Loosen the tilt adjusting screw ①.
2. Remove the azimuth adjusting screw ②.
3. Remove the A/C head screw ③.
4. Unsolder the A/C head PWB soldered to the A/C head assembly.

Notes:

1. After replacement, be sure to perform the adjustment of the tape drive train (see page 24). Under any circumstances, avoid touching the head. Clean the head, if touched with your finger, with alcohol.
2. Take care that the azimuth spring does not fly off when removing the A/C head screw.

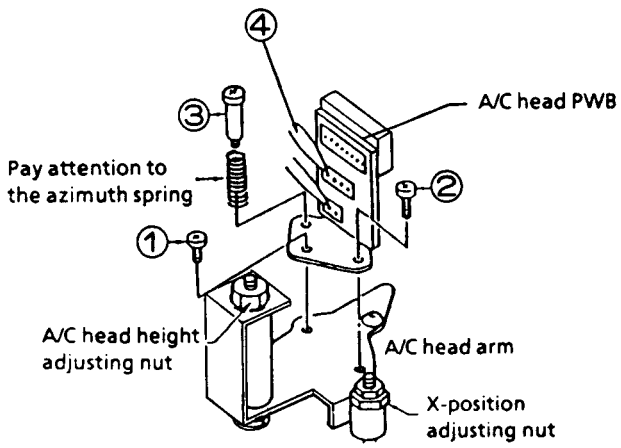


Figure 4-26.

- **Replacement**

1. Solder the removed A/C head PWB onto a new A/C head assembly.
2. The A/C head assembly is attached so that the A/C head arm and A/C head plate are roughly parallel to each other.

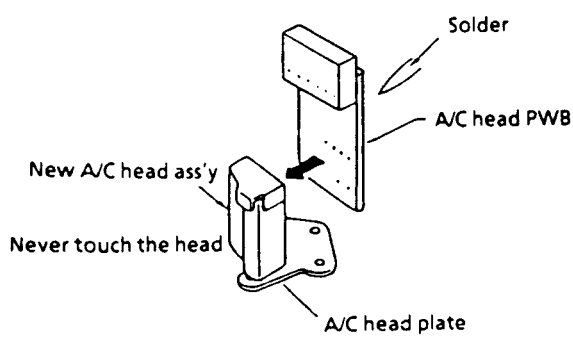


Figure 4-27.

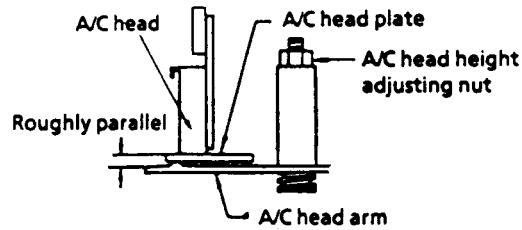
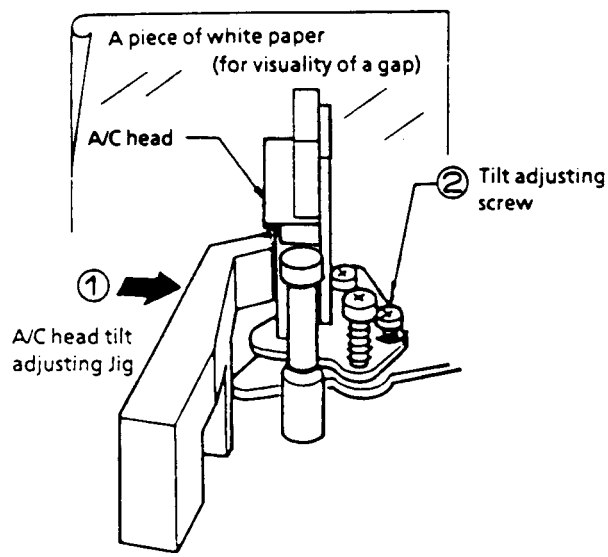


Figure 4-28.

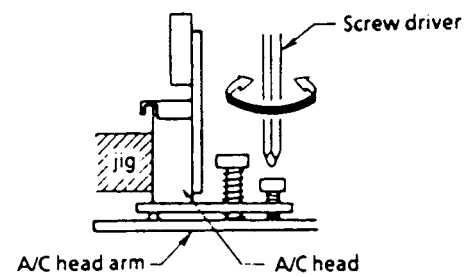
- **Adjustment**

[A/C head tilt angle]

1. Set the mechanism to the loading mode.
2. Place the A/C head tilt adjusting Jig ①.
3. Slowly turn the tilt adjusting screw ② with a screw driver until there is no gap between the Jig and the A/C head.



(a)

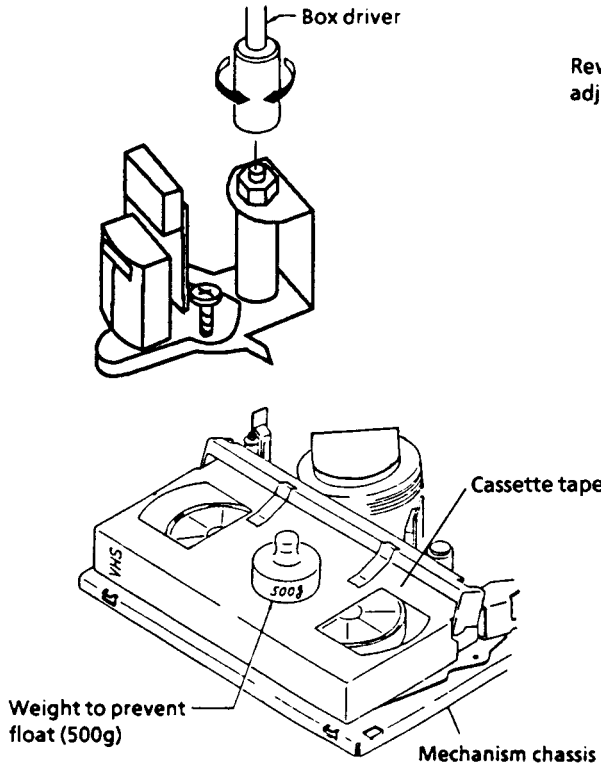


(b)

Figure 4-29.

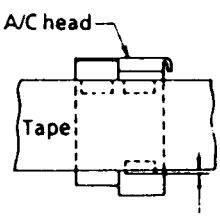
[A/C head height rough adjustment]

- **Setting**



① Roughly adjust the height of the A/C head by turning the A/C head adjusting hexagon nut with the specialized box driver until the tape is in the position shown below.
② Set the cassette tape to the mechanism chassis.
③ Press the PLAY button to the put the unit in the playback mode.

- **Adjustment**



Adjust the nut visually so that the control head is visible 0.3 to 0.5mm below the bottom of the tape.

Figure 4-30.

HEIGHT ADJUSTMENT OF REVERSE GUIDE

[Height adjustment of reverse guide]

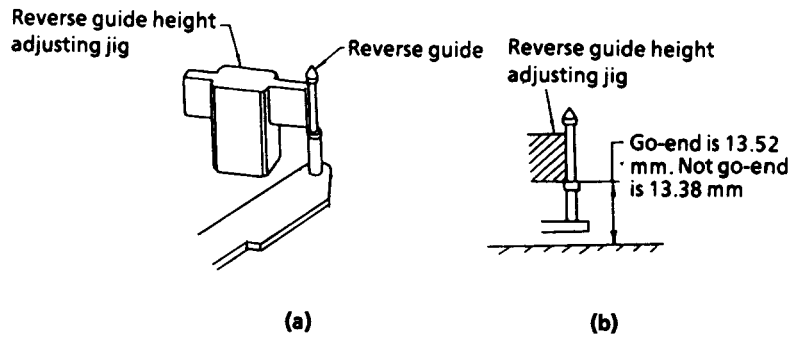


Figure 4-31.

1. In the tape load mode, make adjustment at the 13.38mm side first and then rotate the height adjusting nut by 1/6 turn counterclockwise.
2. Actually load the unit with a tape, put it in the play mode, and make sure the tape is free from wrinkles near the reverse guide.
3. Use a commercially available box driver to turn the height adjusting nut.

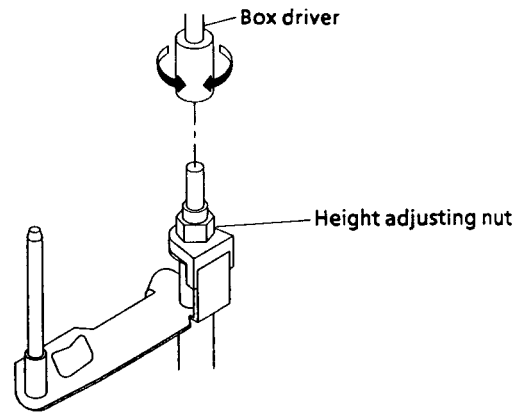


Figure 4-32.

ADJUSTMENT OF TAPE DRIVE TRAIN

1. Remove the cassette housing control assembly.
2. Make a short-circuit between TP5001 (or jumper pin 241) and TP5002 (or jumper pin 242), both located at the left on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.
3. Check and adjust the position of the tension pole. (See page 19.)
4. Check and adjust the video search rewind back tension. (See page 18.)
5. Set the tilt angle of the A/C head. (See page 22.)
6. Rough adjustment of tape drive train.
   a) Connect the oscilloscope to the test point for PB CHROMA envelope output (TP2201). Set the synchronism of the oscilloscope to EXT. The PB CHROMA signal is to be triggered by the head switching pulse (TP2202).
   b) Loosen the setscrew at the lower part of the guide roller, and adjust it with an adjusting screw driver (JIGDRIVERH-4) so that the guide roller turns smoothly. (Do not overloosen the setscrew, which causes insecurity of the guide roller.) (See Figure 4-33.)
   c) Set the alignment tape (monoscope pattern) on the reel disk, and place the unit in the playback mode.
   (Place a 500 g weight on the cassette tape to prevent floating of the cassette tape.)

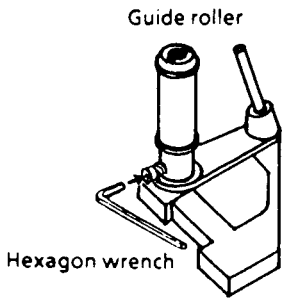


Figure 4-33.

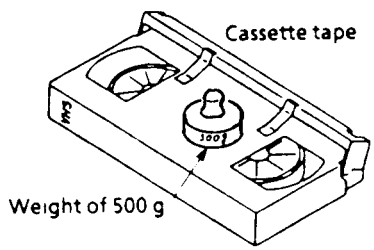
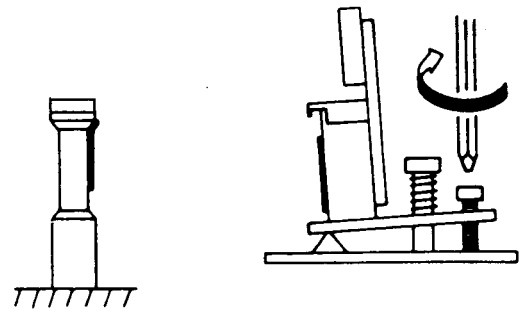
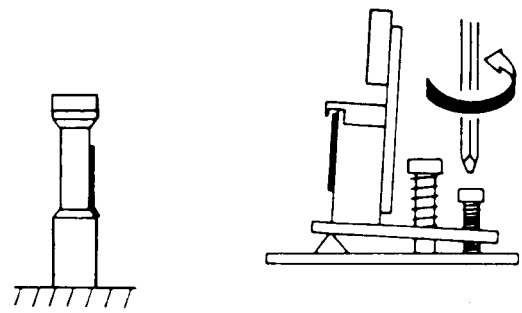


Figure 4-34.

   d) In the X value adjustment mode (see the Electrical Adjustment), change the envelope waveform from MAX to MIN, and MIN to MAX by pushing the (+) or (–) tracking button, and check a flat response is obtained on the waveform.
   e) If a flat response cannot be obtained, roughly adjust the guide rollers on the supply side and take-up side using an adjusting screw driver until a flat response can be obtained.
   f) Turn the A/C head tilt adjusting screw with a screwdriver to prevent the tape from wrinkling at the upper and lower flanges of the fixed guide.
      1) Wrinkles at the upper flange : Turn the above adjusting screw clockwise, as shown in Figure 4-35 (a).
      2) Wrinkles at the lower flange : Turn the above adjusting screw counterclockwise, as shown in Figure 4-35 (b).



(a)



(b)

Figure 4-35.

Notes:

1. Place the tracking control in the center position, and adjust the X-position adjusting nut so that the PB CHROMA envelop becomes maximum for easier rough adjustment of the tape drive train.
2. In the rough adjustment, pay particular attention to the outlet side.

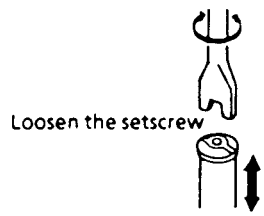


Figure 4-36.

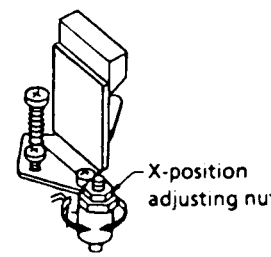


Figure 4-37.

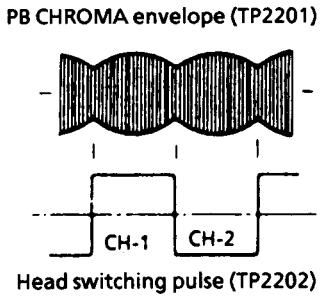


Figure 4-38.

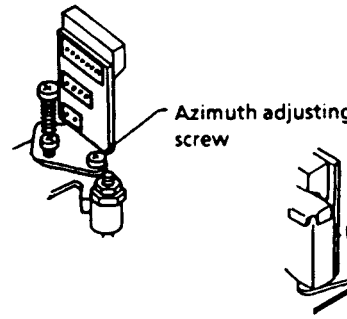


Figure 4-39.

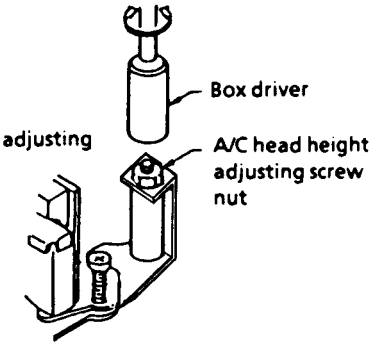


Figure 4-40.

7. Adjustment of A/C head height and azimuth
   a) Connect an oscilloscope to the audio output terminal.
   b) Use the alignment tape and play back its audio 6 kHz signal (monoscope pattern for video signal). Adjust the azimuth adjusting screw to obtain the maximum audio output on an oscilloscope. (See Figure 4-39.)
   c) Use the alignment tape and play back its audio 1 kHz signal (colour bar for video signal) and slowly rotate the A/C head height adjusting nut with the special box driver to obtain the maximum audio output.
   d) Perform the adjustment in b) again.
   e) After this adjustment, apply glyptal to the screws and nuts to fix them.

8. Adjustment of tape drive train and X-Position.
   a) Connect the oscilloscope to the test points (TP2201) for PB CHROMA envelope output. Set the synchronism of the oscilloscope to EXT. The PB CHROMA signal is to be triggered by the head switching pulse (TP2202).
   b) Play back the tape drive train alignment tape.
   c) Push the (+) or (–) button to change the envelope waveform from MAX to MIN, and MIN to MAX. Adjust the guide roller's height on the supply and take-up sides with an adjusting screw driver, to obtain an envelop waveform that is as flat as possible.
   d) If the tape is above or below the helical lead, the PB CHROMA waveform will take the shape shown in Figure 4-41.
   e) Adjust for maximum flatness of the envelope as the step 6, e) in page 24.

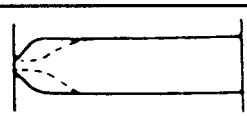
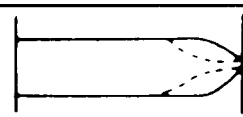
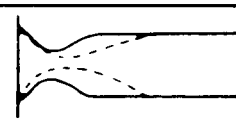
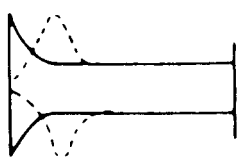
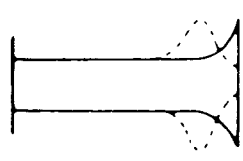
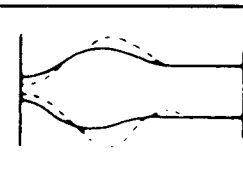
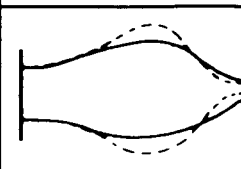
	When the tape is above the helical lead.		When the tape is below the helical lead.	
	Supply side	Take-up side	Supply side	Take-up side
				
				
Adjustment	Supply side guide roller rotated in clockwise direction (lowers guide roller) to flatten envelope.	Take-up side guide roller rotated in clockwise direction (lowers guide roller) to flatten envelope.	Supply side guide roller rotated in counterclockwise direction (raises guide roller) to make the tape float above the helical lead. The supply side guide roller is then rotated in the clockwise direction to flatten the envelope.	Take-up side guide roller rotated in counterclockwise direction (raises guide roller) to make the tape float above the helical lead. The take-up side guide roller is then rotated in the clockwise direction to flatten the envelope.

Figure 4-41.

f) Push the (+) or (–) tracking button to check that a flat response is obtained on the envelope waveform.
g) Secure the guide roller by tightening the guide roller setscrew in the unloading mode.
h) Play back the tape drive train alignment tape to check that the envelope waveform does not change.

9. Adjustment of A/C head X-position.
   a) In the X value adjustment mode (see the Electrical Adjustment), make a short-circuit between TP5001 (or jumper pin 241) and TP5002 (or jumper pin 242), both located at the left on your side on the main PWB, with a 22 ohm resistor, to center the tracking.
   b) Rotate the X-position adjusting nut with an adjusting box driver, and adjust the A/C head position for maximum head switching pulse low side envelope.
   c) Adjust the playback switching point.
   d) Check the flatness of the envelope waveform and sound by playing back a recorded tape.

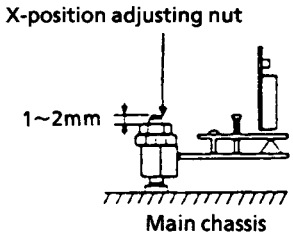


Figure 4-42.

REPLACEMENT OF THE CAPSTAN D.D. (DIRECT DRIVE) MOTOR

- **Remove the cassette housing control assembly.**

- **Removal (Follow the order of indicated numbers.)**

1. Disconnect from the board-to-board connector on the main PWB.
2. Remove the reel belt ①.
3. Remove the screws ②.

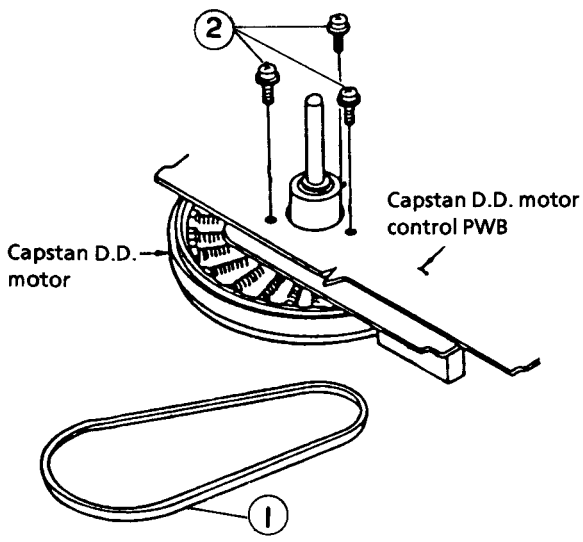


Figure 4-43.

- **Reassembly**

1. Mount the capstan motor on the mechanism chassis making sure not to allow the capstan shaft to hit the mechanism chassis, and attach it with the three screws.
2. Attach the reel belt. Reconnect to the board-to board connector on the main PWB.

Notes:

1. After installing the capstan D.D. motor, be sure to rotate the capstan D.D. motor and check the movement.
2. Check the servo circuit.

REPLACEMENT OF DRUM D.D. MOTOR

1. Put the unit in the cassette eject position.
2. Unplug the power cord.

- **Removal (Reverse the order in reassembly.)**

1. Disconnect the FFC cable ①.
2. Unscrew the stator assembly fixing screws ②.
3. Take out the stator assembly ③.
4. Unscrew the rotor assembly fixing screws ④.
5. Take out the rotor assembly ⑤.

Notes:

1. In removing the stator assembly, part of the drum earth spring pops out of the pre-load collar.
   Be careful not to lose it.
2. Secure the rotor assembly so that the installation positioning holes in the rotor assembly and upper drum assembly match.
   (Match the upper drum's notch with the rotor's hole.)
3. Be careful not to damage the upper drum or the video head.
4. Be sure that the hall device and the stator assembly are not damaged by the rotor assembly or other parts.
5. After installation, adjust the playback switching point.

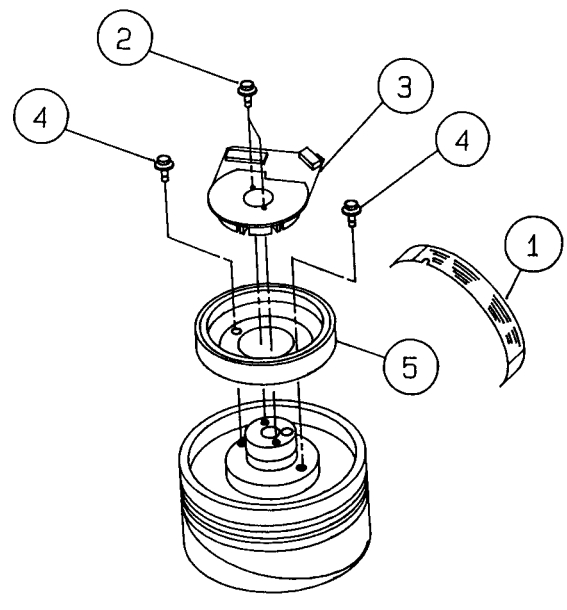


Figure 4-44.

REPLACEMENT OF UPPER DRUM
(2-head/4-head drum models are applicable here. Hi-Fi models are equipped with an upper-and-lower drum assembly.)

Note:

The gap between the lower drum and the upper drum is very accurate, in the order of microns, and care should be paid to their replacement. Even a slight amount of foreign material will affect the accuracy of their reassembly.

- **Replacement (Follow the order of the indicated numbers.)**

① Remove the drum earth brush and its spring ①.
② Put a mark for the direction of the pre-load collar and the drum shaft ②.
③ Loosen the set screws (M4) ③ of the pre-load collar. Take out the pre-load collar upward.
④ Pull up the upper drum ④ out of position.

Note:

1. Remove the drum motor, referring to the drum motor replacement.
2. Put a mark, with a marking pen or the like, in order to identify the direction of the pre-load collar and the drum shaft. Now remove the pre-load collar.
3. Be careful not to lose the drum earth brush and drum earth brush spring.
   Handle the brush with care not to allow any dust and foreign matters on it.
4. Avoid touching the drum surface with bare hands.
5. Pull out the upper drum with care so that it may not be tilted.
6. Do not hit the screws when tightening them.

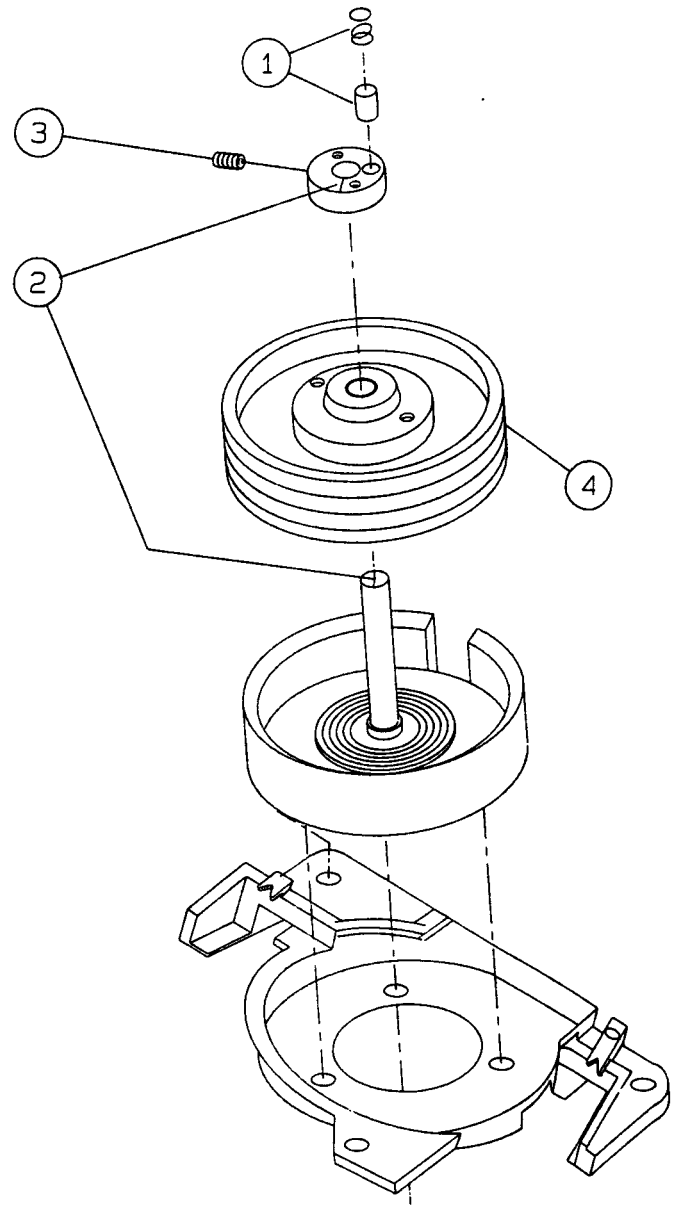


Figure 4-45.

- **Drum replacement (for 2/4 drums; drum assembly supplied for Hi-Fi models)**

1. Clean up the drum shaft.
2. Make a clearance at the rotary transformer. This is an important procedure to maintain the performance.
   1) Some rotary transformer clearance shims are packaged in the servicing upper drum assembly or lower drum assembly. Install the thinnest (0.06 mm) of the shims onto the lower drum shaft. (Refer to Fig. 4-46(a) for thickness.)
   2) Install the upper drum assembly onto the drum shaft.
   3) Install the pre-load collar.
   4) Exert a force of 14.7 N (1.5 kgf) on the pre-load collar from above (using a commercially available load meter). Tighten up the set screws (M4) of the pre-load collar.
   5) Turn the upper drum by hand and listen to see if the rotary transformer gives no rubbing sound.
   6) If the transformer sounds, replace the installed shim with the next thicker shim.
      Take the above steps 1) thru 5) until no rubbing sound is heard any longer.
   7) Make sure no rubbing sound is heard. Finally add the 0.03 mm thick shim.
3. Place the pre-load collar back in position in the direction marked in disassembling. (See Fig. 4-45. for setting.)
4. Exert a force of 14.7 N (1.5 kgf) upon the pre-load collar from above. Tighten up the set screws of the pre-load collar (1.18 Nm (12 kgf·cm)).
5. Place the drum earth brush, drum earth brush spring and drum motor back in position.
6. After replacement, be sure to check the tape drive train adjustment (See page 24.) and the following electric adjustments.
   - Adjustment of the playback switching point.
   - Checking and adjustment of the X-position.
   - Adjustment of SP slow tracking preset.

- **Precautions in drum replacement**

1. The drum assembly is very delicate. Handle it with enough care.
2. Be certain that the drum surface is free from dust, dirt and any other foreign matters.
3. Carefully adjust the rotary transformer clearance because this adjustment is important in order to maintain the performance.
4. Install the upper drum straight down to the drum shaft. Do not apply any excessive force upon the upper drum.
5. Finally clean up the drum.

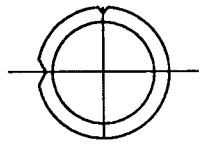
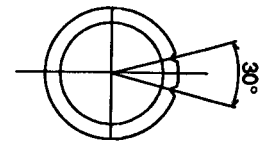
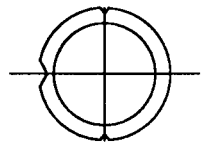
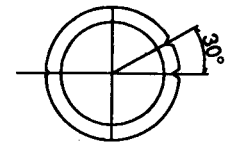
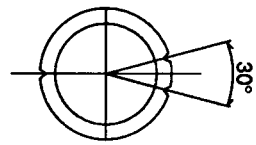
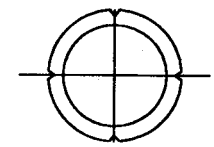
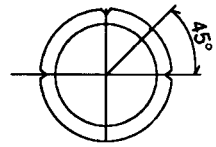
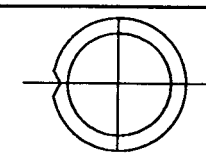
No	Thickness (mm)	Shape	No	Thickness (mm)	Shape
1	t = 0.060		5	t = 0.100	
2	t = 0.070		6	t = 0.110	
3	t = 0.080		7	t = 0.120	
4	t = 0.090		8	t = 0.030	

Figure 4-46(a).

Shim thickness variations

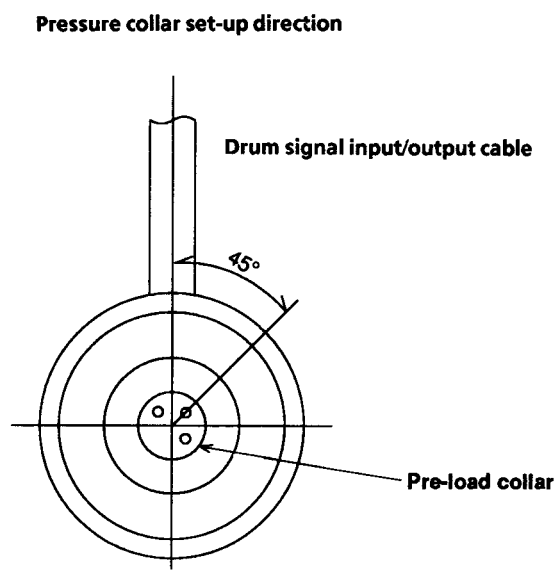


Figure 4-46(b).

ASSEMBLE THE MECHANISM'S PARTS REQUIRING THE PHASE MATCHING IN THE STEPS BELOW.

1. Assembling the pinch roller assembly and the pinch drive cam (on the front of the mechanism chassis).
2. Mounting the shifter (on the back of the mechanism chassis).
3. Mounting the master cam (on the back of the mechanism chassis).
4. Mounting the connection gear, slow brake and loading motor assemblies (on the back of the mechanism chassis).

1. Assembling the pinch roller assembly and the pinch drive cam (on the front of the mechanism chassis).

Place the following parts in position in numerical order.

(1) Pinch drive cam ①
(2) Pinch roller and pinch double-action lever ②
(3) Open lever ③

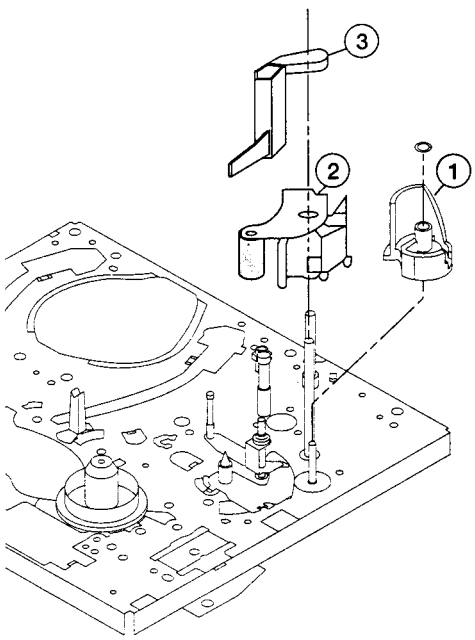


Figure 4-47.

① Insert Pinch Drive Cam.

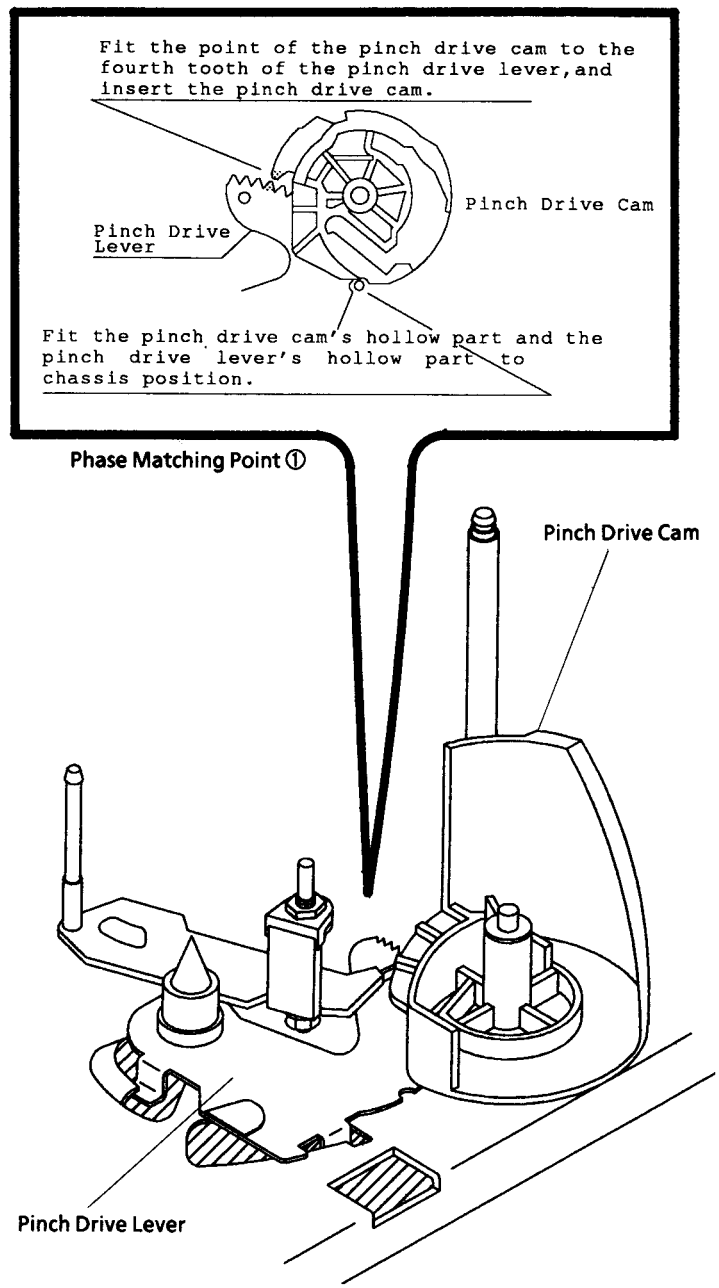

Fit the point of the pinch drive cam to the fourth tooth of the pinch drive lever, and insert the pinch drive cam.
Pinch Drive Cam
Pinch Drive Lever
Fit the pinch drive cam's hollow part and the pinch drive lever's hollow part to chassis position.
Phase Matching Point ①
Pinch Drive Cam
Pinch Drive Lever

Figure 4-48-1.

② Insert Pinch Roller/Pinch Double Action Lever Ass'y.

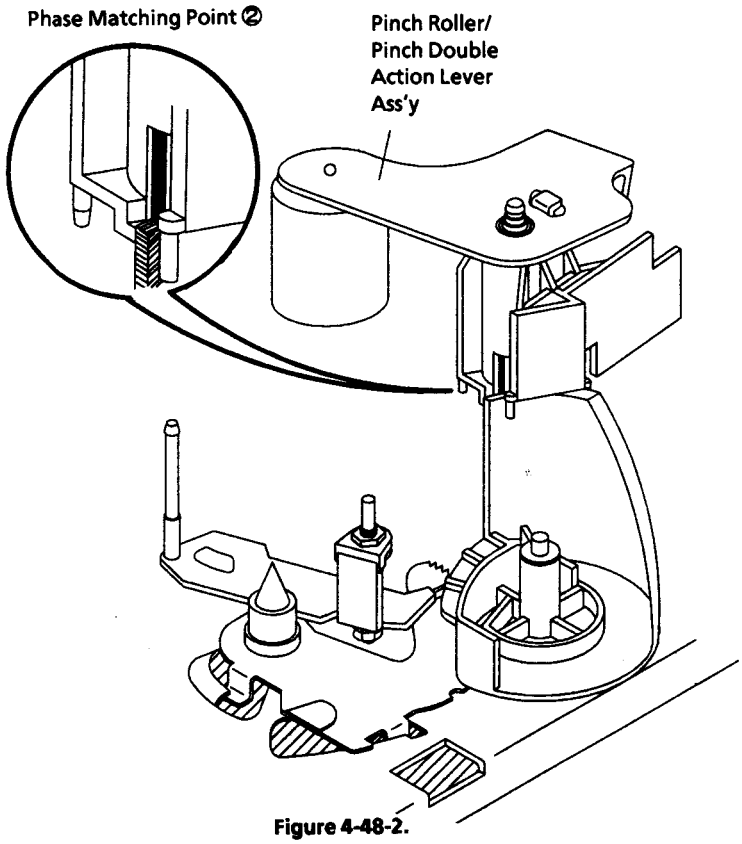


Figure 4-48-2.

③ Insert Open Lever.

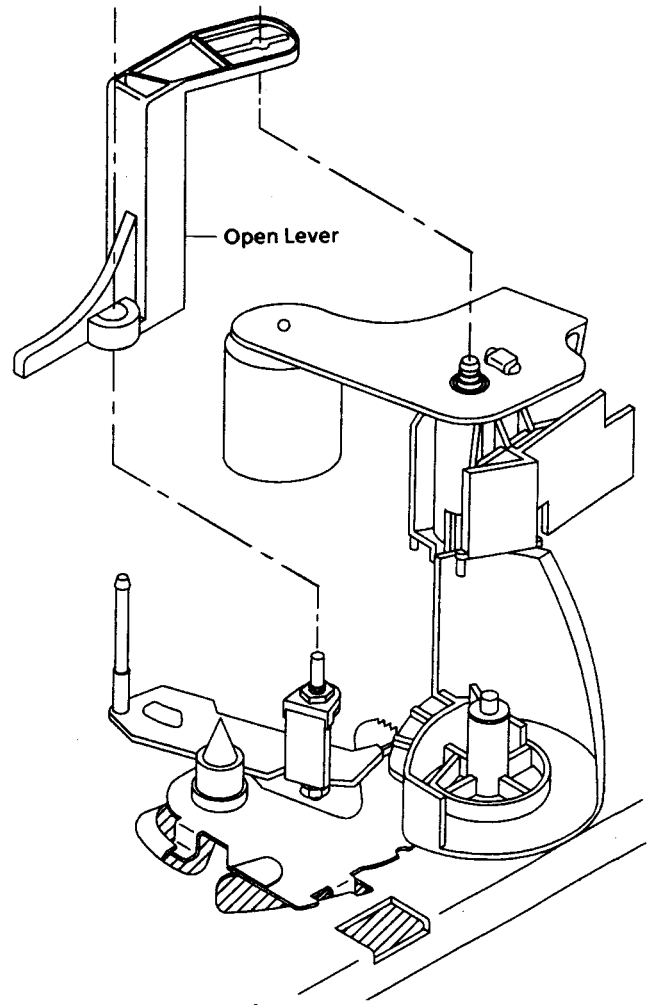
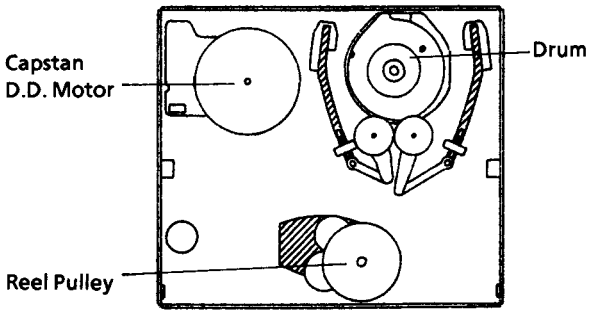


Figure 4-48-3.

2. Mounting the shifter (on the back of the mechanism chassis).



(Bottom Side of mechanism chassis)

Figure 4-49.

1. Make sure that the loading gear is at the point (1) as shown below.
2. Place the shifter in position, keeping in mind the 7 insertion points and the five relief points.
3. For the phase matching at the insertion point (1), see the point (2) as shown below.
4. Finally fix the shifter with two washers located on insert points ① and ⑥.

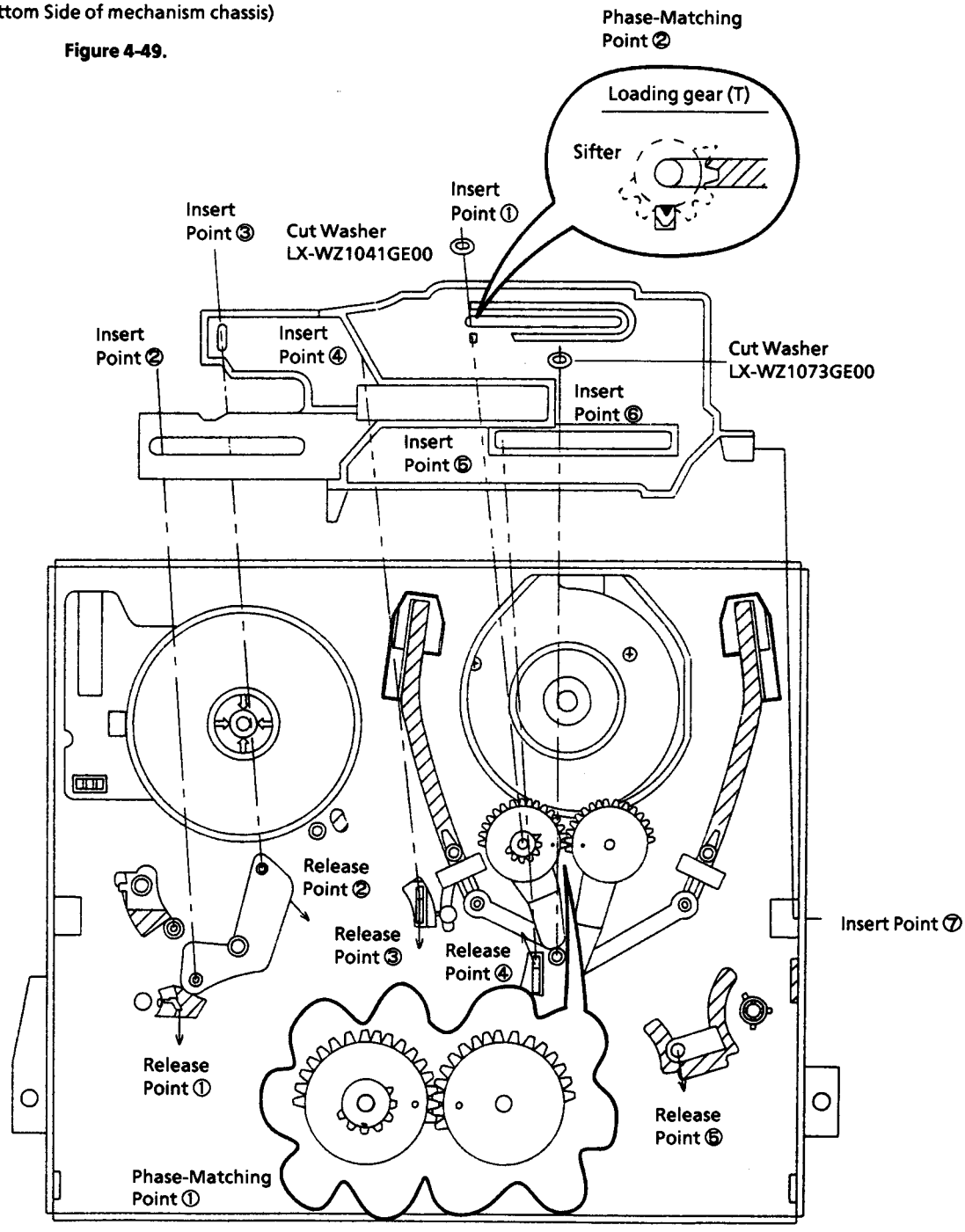


Figure 4-50.

3. Mounting the master cam (on the back of the mechanism chassis).

(1) Make sure beforehand that the shifter is at the point as shown below.

(2) Place the master cam in the position as shown below.

Note:

See the figure below for the phase matching between the master cam and the cassette control drive gear.

(3) Finally fix the master cam with E ring.

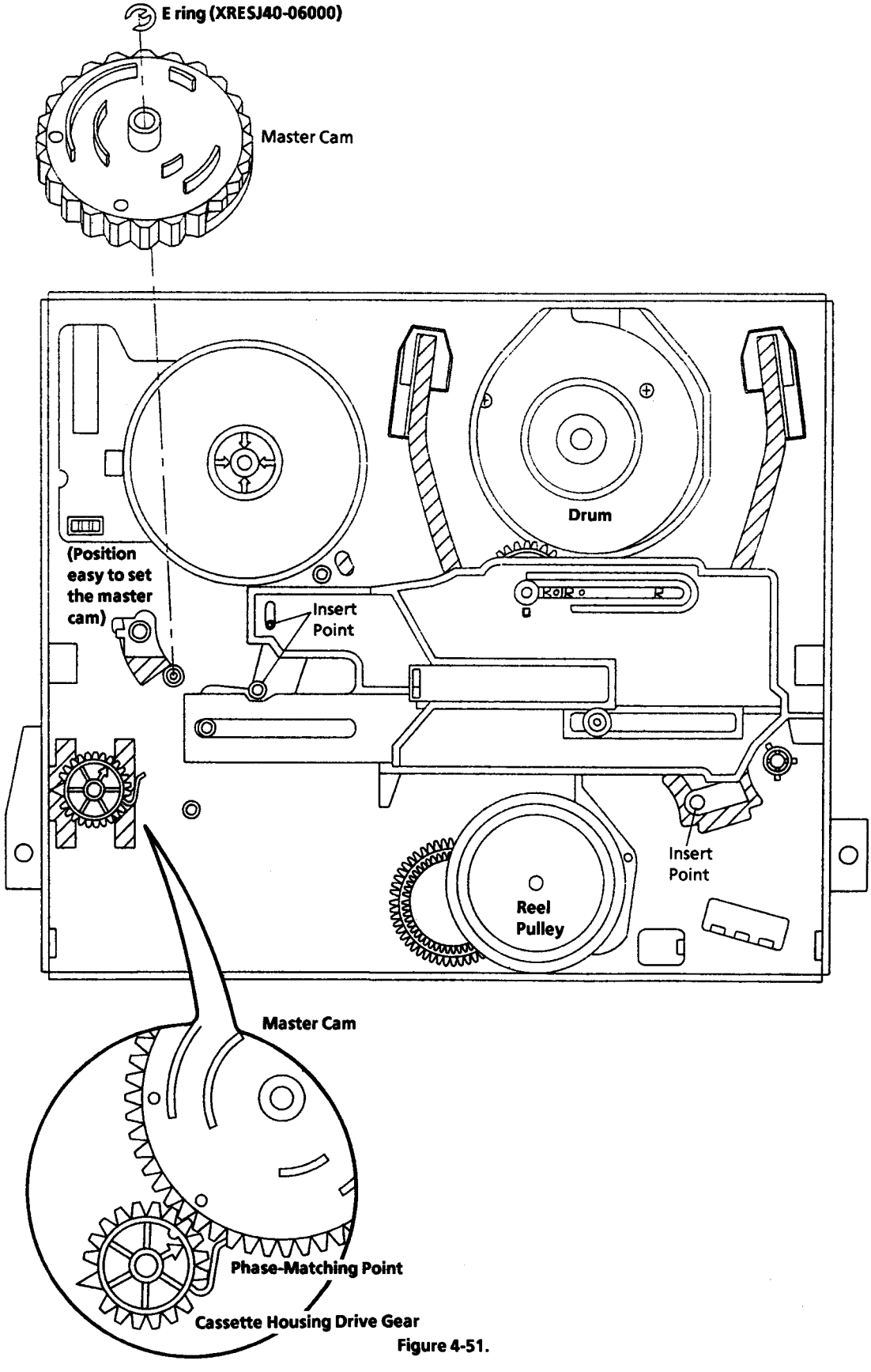


Figure 4-51.

4. Mounting the connection gear, slow brake and loading motor assemblies (on the back of the mechanism chassis).

(1) Assemble the connect gear.
(2) Assemble the slow brake.
(3) Assemble the loading motor unit.

Note:
Let the slow brake leg out of the front of the mechanism chassis. Catch the spring to the take-up fixing guide that is at the left of the A/C head.

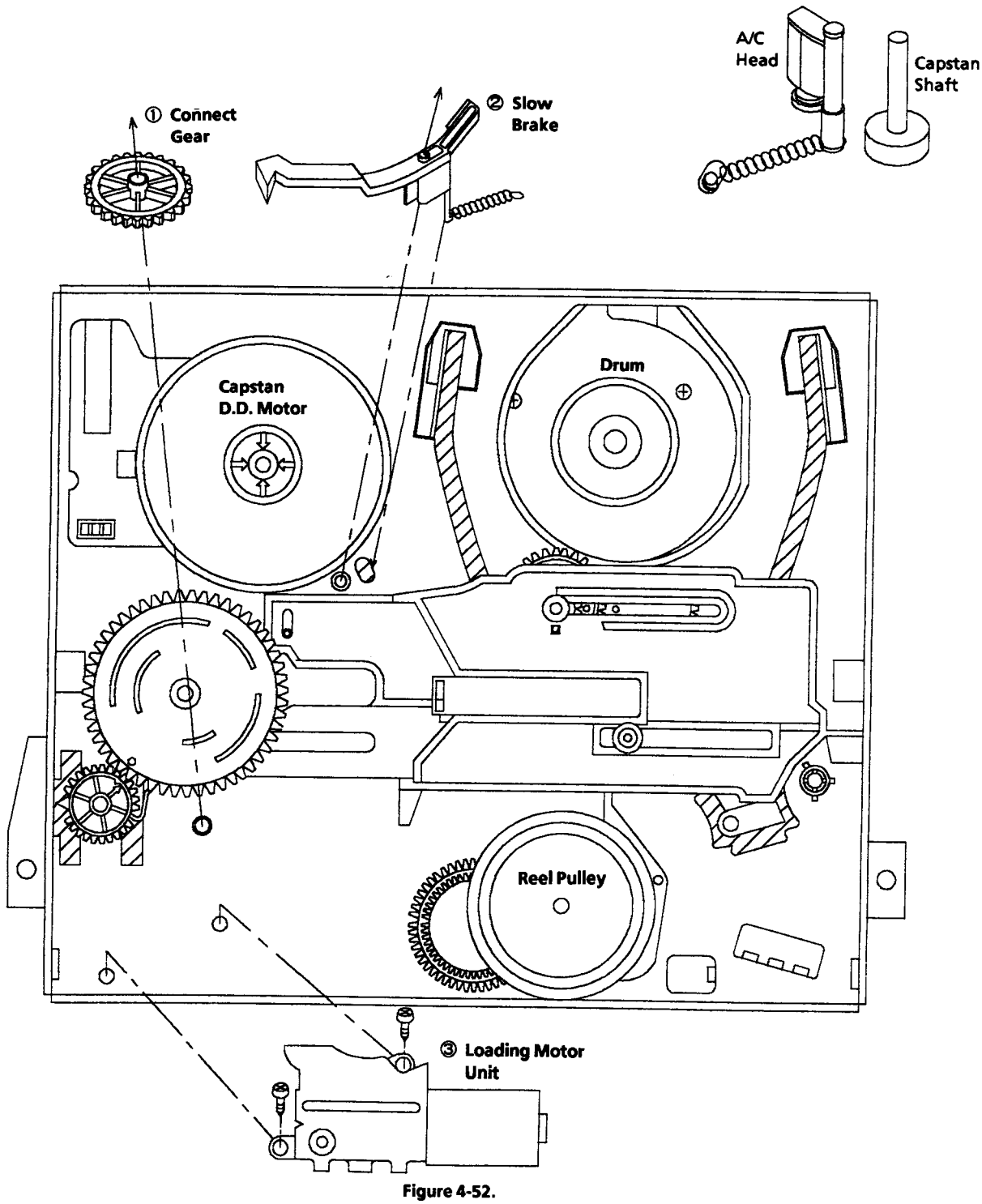


Figure 4-52.

Note:
Before setting up the loading motor, make sure the phase is matched. To do so, turn the connection gear clockwise and check to see if the loading is complete and if the pinch roller comes into contact.

When these actions are made smoothly, return the mechanism to the state as shown above. Finally mount the loading motor unit.

REPLACEMENT OF LOADING MOTOR

- **Removal**

Remove 2 screws.

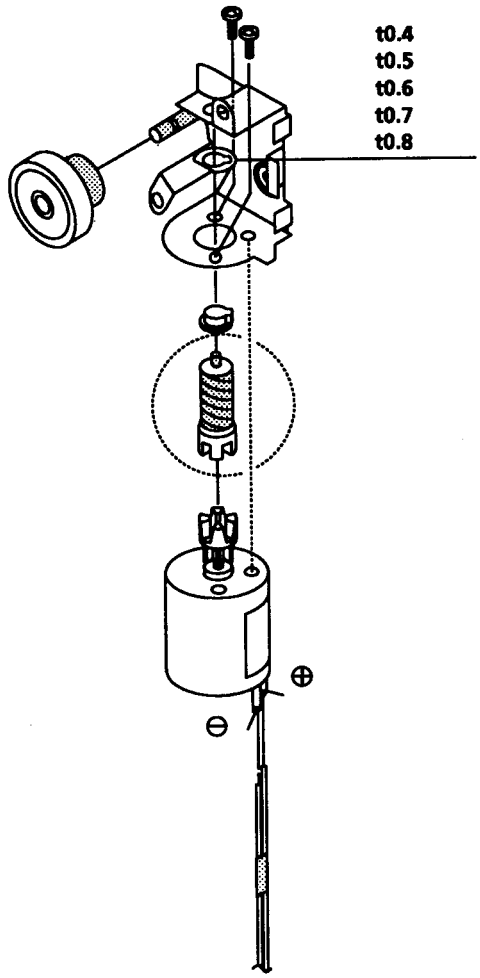


Figure 4-53.

- **Replacement**

① Take out the old loading motor. Place a replacement loading motor as shown above (figure 4-53.).

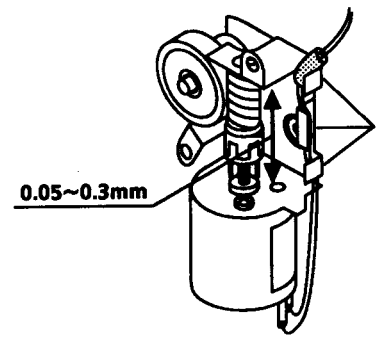


Figure 4-54.

② Adjust the worm gear's thrust gap to 0.05 to 0.3 mm.
Use the specific washers for an appropriate thickness.

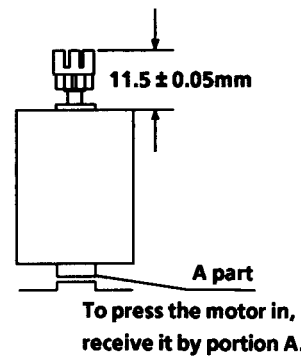
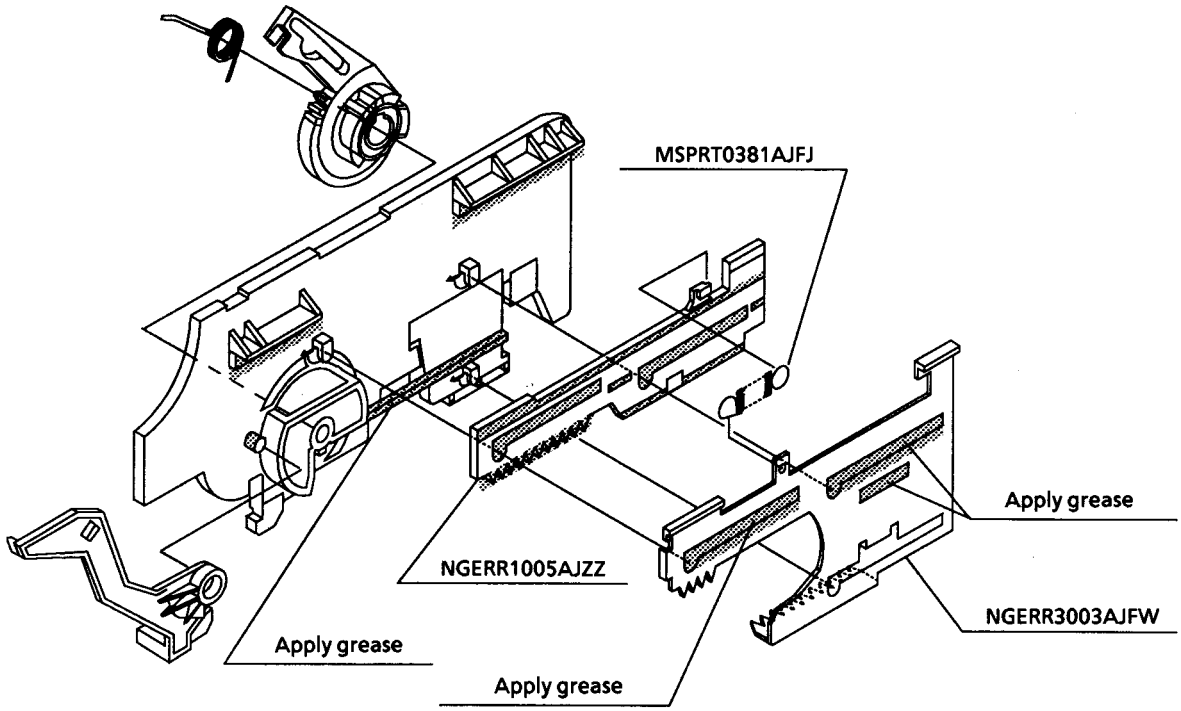


Figure 4-55.

Press-fit the loading motor pulley with a force of less than 98N (10 kgf). Be sure that the pulley is 11.5 ± 0.05 mm away from the motor.

ASSEMBLY OF CASSETTE HOUSING

① Drive Gear R and Drive Angle Ass'y



Phase Matching Point

- Fix the drive angle ass'y to the drive gear R as shown in the figure.

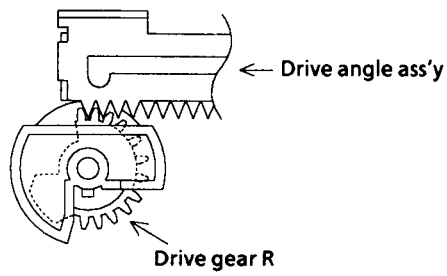


Figure 4-56.

② Synchro Gear, Drive Gear L and Drive Gear R

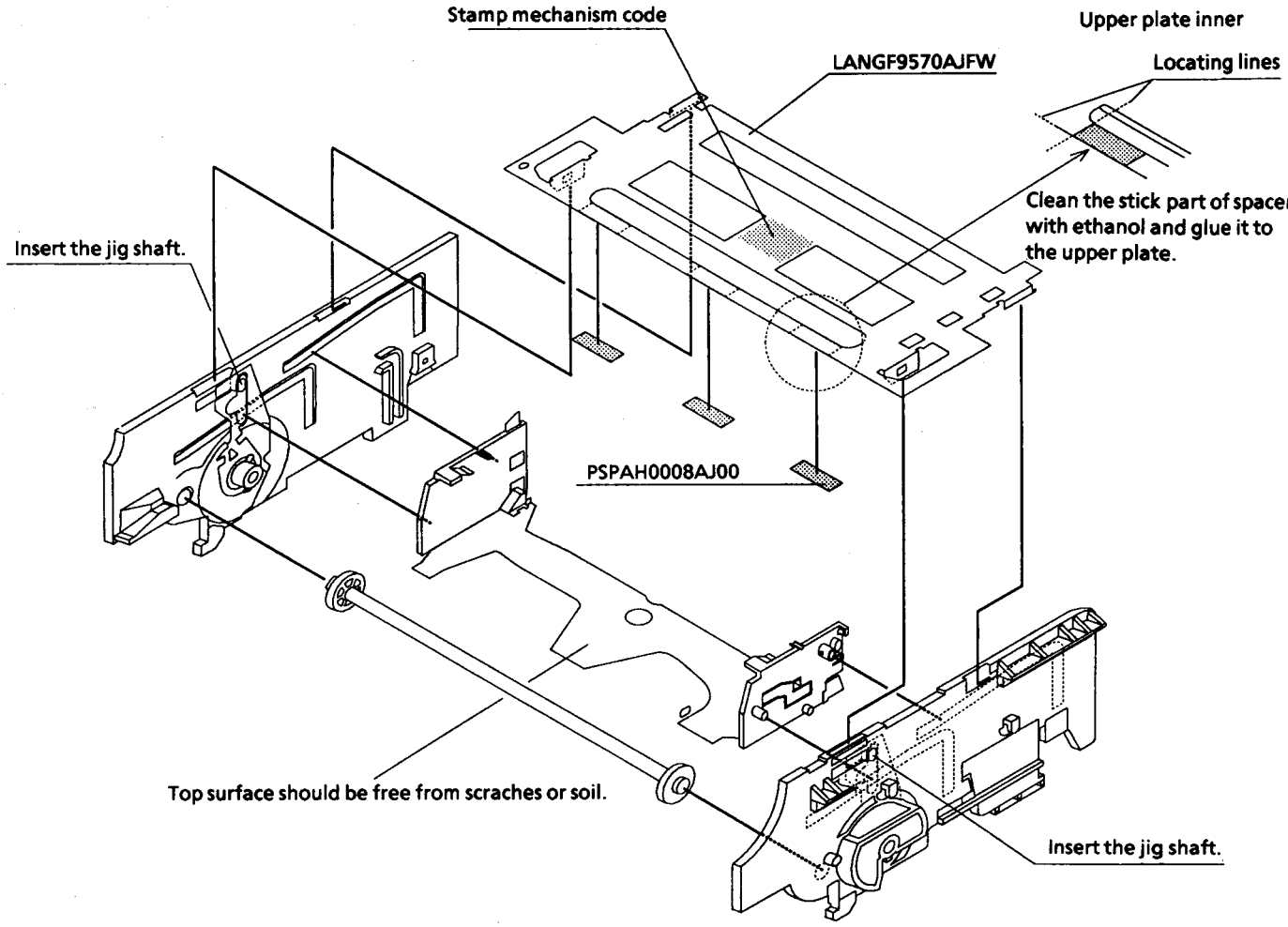

Stamp mechanism code
LANGF9570AJFW
Upper plate inner
Locating lines
Clean the stick part of spacer with ethanol and glue it to the upper plate.
Insert the jig shaft.
PSPAH0008AJ00
Top surface should be free from scraches or soil.
Insert the jig shaft.

Figure 4-57.

Align the drive gear's round hole with the synchro gear's triangular (△) symbol. Do this alignment for both the drive gears.

Phase Matching Point

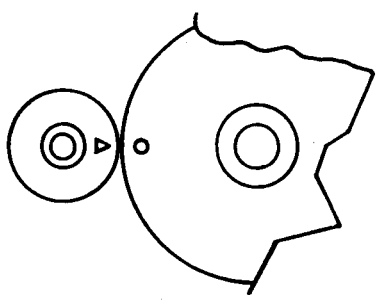


Figure 4-58.

Note:
Do not over-turn both of the drive gears when the phase has been matched. These gears are partially toothless and might come out of mesh with the synchro gear. In such a case, the phase needs re-matching.

5. ELECTRICAL ADJUSTMENT

Notes:

- Before the adjustment:
  Electrical adjustments discussed here are often required after replacement of electronic components and mechanical parts such as video heads.
  Check that the mechanism and all electric components are in good working condition prior to the adjustments, otherwise adjustments can not be completed.

- Instruments required:
  ◎Colour TV monitor
  ◎Audio signal generator
  ◎DC voltmeter
  ◎Blank video cassette tape
  ◎Screwdriver for adjustment
  ◎Colour bar signal generator
  ◎Dual-trace oscilloscope
  ◎AC milli-voltmeter
  ◎Frequency counter
  ◎Alignment tape (VROCPSV)

※ Servicing precautions
When the IC804 (E^2PROM) has been replaced, make the following reprogramming. Depending on models, the IC804 (E^2PROM) has been factry-adjusted for it's memory function.
It's therefore necessary to reprogram the memory function for the model in question.
Note that the servo circuit requires readjustments for the head switching point, slow and still modes.

- Location of controls and test points

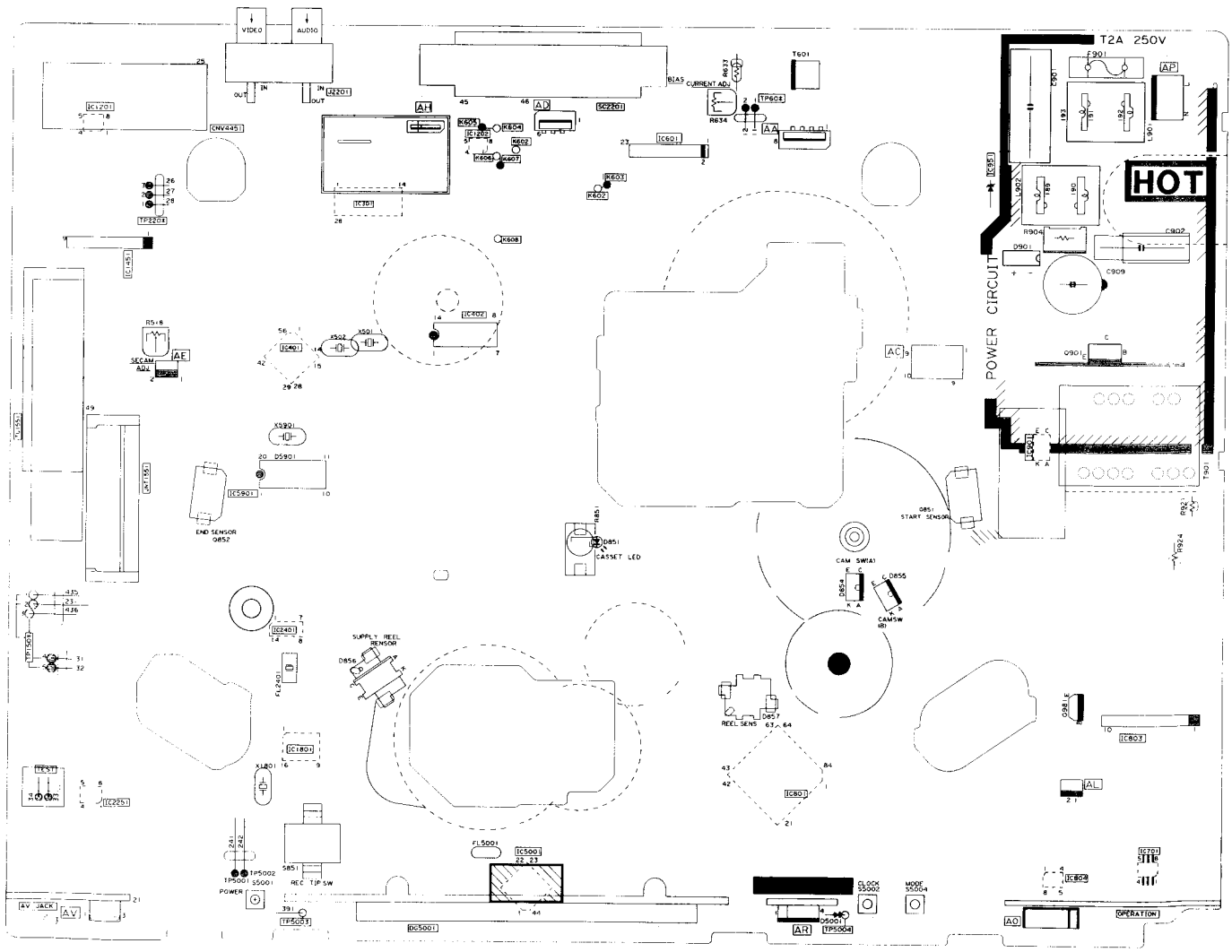


Figure 5-1.

SERVO CIRCUIT ADJUSTMENT

ADJUSTMENT OF HEAD SWITCHING POINT

Measuring instrument	Dual-trace oscilloscope Colour TV monitor
Mode	Playback
Cassette	Alignment tape (VROCPSV)
Test point	TP2202 (H. SW. P.) to CH-1 VIDEO OUT jack to CH-2 (CH-1 trigger slope switch at (+), Internal trigger at CH-1 side.)
Specification	6.5 ± 0.5H (lines)

1. Remove the front panel and play the alignment tape. (VROCPSV)
   (Playback picture on the monitor screen.)
2. Make for a moment short-circuit between jumper pins 33 and 34 both located at the left on your side on the main PWB.
   Be sure that all the fluorescent display tubes light up into the TEST mode. (See Note below)
3. Press the PLAY button.
   Be sure the "PLAY" appears in the fluorescent display tubes flashing (about 1Hz) into the auto PG adjustment operating.
   Note:
   When the manual PG adjustment, observe the waveform with an oscilloscope and make adjustment FF or REW button so that the specification.
4. Stop the "PLAY" appears in the flashing of fluorescent display tubes at adjusted.
5. Press the STOP button in the return to normal mode.
6. Make this checking of waveform on the oscilloscope screen be as shown in Figure 5-2. just after the head switching point have been adjusted.

Notes:

① Set-up of TEST mode.
When the adjustment of HEAD SWITCHING POINT, AUTO TRACKING function is invalid.

② When the cassette housing control ass'y is removed, set-up of mechanism operating mode.

1) Replug the AC power cord a few minute later.
2) Make a short-circuit between TP5001 (or jumper pin 241) and TP5002 (or jumper pin 242), both located at the left on your side on the main PWB, with a 22 ohm resistor to center the tracking.
3) AC power cord is plugged in.
4) You can make mechanism operating mode. Replug the AC power cord a few minute later.

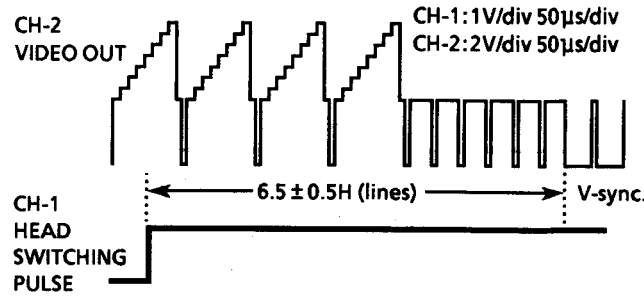


Figure 5-2.

ADJUSTMENT OF SP/LP SLOW TRACKING PRESET

Measuring instrument	Colour TV monitor
Mode	Playback
Cassette	Self-recorded tape (SP/LP mode) (See Note below)
Control	Tracking control buttons (+) or (−)
Specification	Minimized noise on monitor screen

1. Have the unit to receive a good TV broadcast or feed a video signal to the VIDEO IN jack. (See note ② below)
2. Set the tape speed in SP mode by using the remote control and record the signal on tape.
3. Rewind and play the tape where signal was recorded in above step.
4. Press the SLOW button on the remote control, and playback the recorded portion in the slow mode.
5. Make for a moment short-circuit between jumper pins 33 and 34 both located at the left on your side on the main PWB.
   Be sure that all the fluorescent display tubes light up into the TEST mode.
6. Look at the monitor screen and adjust the (+) or (−) TRACKING buttons so that the there is noise disappears from the screen.
7. Press the STOP button to return to normal mode.
8. Play the tape a few seconds then press the SLOW button again and make sure there is no noise in the screen.
   (For the LP mode put adjustment at the same adjustment way as SP mode.)

Notes:

① Self-recorded tape means a cassette whose program was recorded by the unit being adjusted.

② The TV program will not be recorded if RCA or 21pin plugs are pluged in to the AUDIO/VIDEO input terminals.

ADJUSTMENT OF FV (False Vertical Sync) OF STILL PICTURE

Measuring instrument	Colour TV monitor
Mode	Playback still
Cassette	Self-recorded tape (SP mode) (See Note below ②)
Control	Tracking control buttons (+) or (–)
Specification	No vertical jitter of picture

1. Play a cassette which was recorded by the unit in SP mode.
2. Press the PAUSE/STILL button to freeze the picture.
3. Look at the monitor screen and adjust (+) or (–) TRACKING buttons so that the vertical jitter of the picture to be minimized.
4. Play and freeze the self-recorded tape in SP mode and make sure vertical jitter of the picture is not noticeable.
   (For the LP mode put adjustment at the same adjustment way as SP mode.)

Note:

① The FV goes back to the it's initial state when the unit is put into the system controller reset mode due to power failure, etc.
In this case, preset the FV once again.

② Self-recorded tape is a cassette whose program was recorded by the unit being adjusted.

Y/C CIRCUIT ADJUSTMENT

CHECKING OF VIDEO E-E LEVEL

Measuring instrument	Oscilloscope
Mode	E-E or Record
Input signal	EIA colour bar (1.0Vp-p)
Test point	VIDEO OUT jack
Specification	1.0 ± 0.1Vp-p

1. Connect a 75 ohm terminating resistor to the VIDEO OUT jack and connect an oscilloscope across this terminating resistor. (See Note below.)
2. Feed a colour bar signal to the VIDEO IN jack.
3. Make sure that the E-E signal amplitude is 1.0 Vp-p as shown in Figure 5-3.

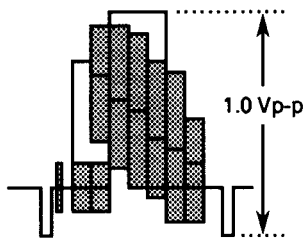


Figure 5-3.

Note:
If the 75 ohm terminating resistor is missing, the signal amplitude will be doubled.

CHECKING OF WHITE CLIP LEVEL

Measuring instrument	Oscilloscope
Mode	E-E or Record
Input signal	EIA colour bar (1.0Vp-p)
Test point	Pin (48) of IC401, GND
Specification	190 ± 5% (See note below)

1. Connect a oscilloscope to Pin (48) of IC401 and GND.
2. Feed the colour bar signal to the VIDEO IN jack and set the unit in E-E or recording mode.
3. Make sure that the overshoot of the video signal is clipped at 190% as shown in Figure 5-4.

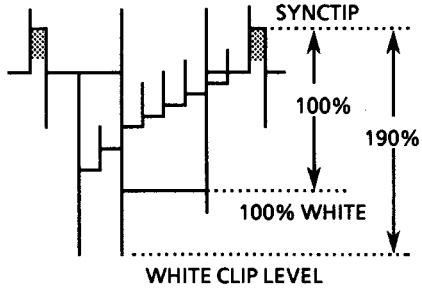


Figure 5-4.

Note:
From sync tip to white peak, the level is 100%.
The white clip level is 90% above the white level.

CHECKING OF RECORD LEVEL

Measuring instrument	Oscilloscope
Mode	Record mode
Input signal	EIA colour bar (1.0Vp-p)
Test point	4head models: Pin (26) of IC301, GND.
Specifications	4head models (SP mode) Chroma (Red) : 47 ± 4mVp-p Sync tip : 200 ± 30mVp-p
	4head models (LP mode) Chroma (Red) : 34 ± 3mVp-p Sync tip : 170 ± 20mVp-p

1. Feed the colour bar signal to the VIDEO IN jack and set the unit in recording mode.
2. Connect an oscilloscope to shown in table.
3. Make a short circuit between pin (52) of IC401 and the GND using a 47µF/16V capacitor to minimize the FM luminance signal.
4. Make sure so that the amplitude of the chroma (red) portion is specified as shown in Figure 5-5(a).
5. Disconnect the capacitor that was connected in step 3.
6. Make sure so that the amplitude of the sync tip portion is specificed as shown in Figure 5-5(b).

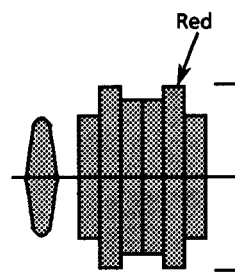


Figure 5-5(a).

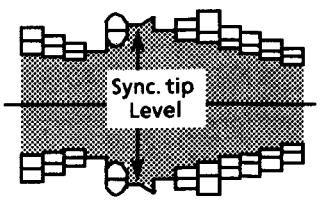


Figure 5-5(b).

CHECKING OF PLAYBACK LEVEL

Measuring instrument	Oscilloscope
Mode	Record/Playback
Input signal	EIA colour bar (1.0Vp-p)
Test point	VIDEO OUT jack
Specification	1.0 ± 0.1Vp-p

1. Be sure that E-E level has been correctly specificed.
2. Connect a 75 ohm terminating resistor to the VIDEO OUT jack and connect an oscilloscope across this terminating resistor. (See Note below.)
3. Feed a colour bar signal to the VIDEO IN jack and set the unit in recording mode.
4. Play the colour bar portion of the recorded tape.
5. Make sure that the output signal amplitude is 1.0Vp-p as shown in Figure 5-6.

Note:
If the 75 ohm terminating resistor is missing, the signal amplitude will be doubled.

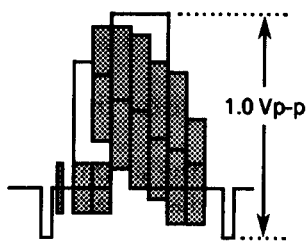


Figure 5-6.

AUDIO CIRCUIT

CHECKING OF E-E LEVEL

Measuring instrument	AC milli-voltmeter
Mode	E-E/Record
Input signal	1kHz, – 8.0dB (at RCA type jack) 1kHz, – 3.8dB (at 21 pin type jack)
Test point	AUDIO OUT jack
Specification	– 8.0 ± 2dB (at RCA type jack) – 3.8 ± 2dB (at 21 pin type jack)

1. Connect an oscilloscope to the AUDIO OUT jack.
2. Feed the audio signal shown in table to the AUDIO IN jack.
3. Put the unit in E-E or recording mode.
4. Make sure that the output level is value shown in table.

CHECKING OF AUDIO PLAYBACK LEVEL

Measuring instrument	AC milli-voltmeter.
Mode	Playback
Input signal	Alignment tape. (VROCPSV) (1kHz level conrtol signal)
Test point	AUDIO OUT jack
Specification	$-9\ ^{+2dB}_{-1dB}$

1. Playback the Alignment tape. (VROCPSV 1kHz level audio signal)
2. Connect an AC milli-voltmeter to the AUDIO OUT jack.
3. Make sure that the output level is value shown in table.

CHECKING OF AUDIO RECORD LEVEL

Measuring instrument	AC milli-voltmeter
Mode	Record/playback
Input signal	1kHz, – 8.0dB (at RCA type jack) 1kHz, – 3.8dB (at 21 pin type jack)
Test point	AUDIO OUT jack
Specification	– 8.0 ± 3dB (at RCA type jack) – 3.8 ± 3dB (at 21 pin type jack)

1. Connect an oscilloscope to the AUDIO OUT jack.
2. Feed the audio signal shown in table to the AUDIO IN jack.
3. Make the self-recording and playback of the signal.
4. Make sure that the output level is value shown in table.
   If it is out of specified value, verify the bias current (ADJUSTMENT OF AUDIO BIAS CURRENT below).

ADJUSTMENT OF AUDIO BIAS CURRENT

Measuring instrument	AC milli-voltmeter
Mode	Record
Input signal	Not required
Test point	TP601 (+)~TP602 (–)
Control	R634 Bias current control
Specification	2.5 ± 0.1mVrms.

1. Connect an AC milli-voltmeter to TP601 (+) and TP602 (–).
   (Use TP602 for ground lead.)
2. Put the unit in recording mode.
3. Adjust R634 so that the AC milli-voltmeter read is 2.5 ± 0.1mVrms.

CHECKING OF ERASE VOLTAGE AND OSCILLATION FREQUENCY

Measuring instrument	Oscilloscope
Mode	Record
Test point	Full erase head
Control	T601
Specification	70 ± 5kHz,40Vp-p or greater.

1. Put the unit in record mode.
2. Connect an oscilloscope across the full erase head.
3. Make sure the erase voltage across the full erase head is approx. 40Vp-p or more and frequency is 70 ± 5kHz.

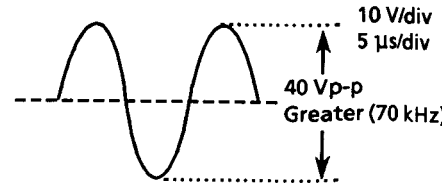


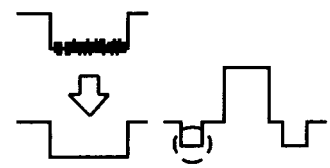
Figure 5-7.

RF CIRCUIT

ADJUSTMENT OF RF AGC CIRCUIT (EXCEPT G/S Version)

Measuring instrument	Oscilloscope
Mode	Good TV Commercial broadcast reception
Test point	TP1502 (Sig.), TP1501 (GND)
Control	VR001 AGC control
Specification	Just before shrinking (See of Figure 5-8.)

1. Have the unit received good TV commercial broadcast reception.
   (Input field strength: 80dBμV of antenna terminal.)
2. Connect an oscilloscope to test points TP1502 (Sig.) and TP1501 (GND).
3. Observe the video output terminal waveform on the oscilloscope.
   Adjust VR001 (AGC control) in the IF pack until the noise disappears from the oscilloscope screen and the waveform nearly comes into sync.



Just before shrinking

Figure 5-8.

ADJUSTMENT OF RF AGC CIRCUIT (G/S-Version ONLY)

Measuring instrument	DC voltmeter VHF signal generator
Mode	RF signal at E12-CH (by VHF signal generator) (EBU colour bar signal at 87.5% modulated.)
Test point	TP1503 (+), TP1501 (−)
Control	VR001 AGC control
Specification	4.5 ± 0.1V (When the tuner make use of VTUVTSH6HZ50/) 4.5 ± 0.1V (When the tuner make use of VTUOF4EG-721F) 4.5 ± 0.1V (When the tuner make use of VTUOF4EG-721F)

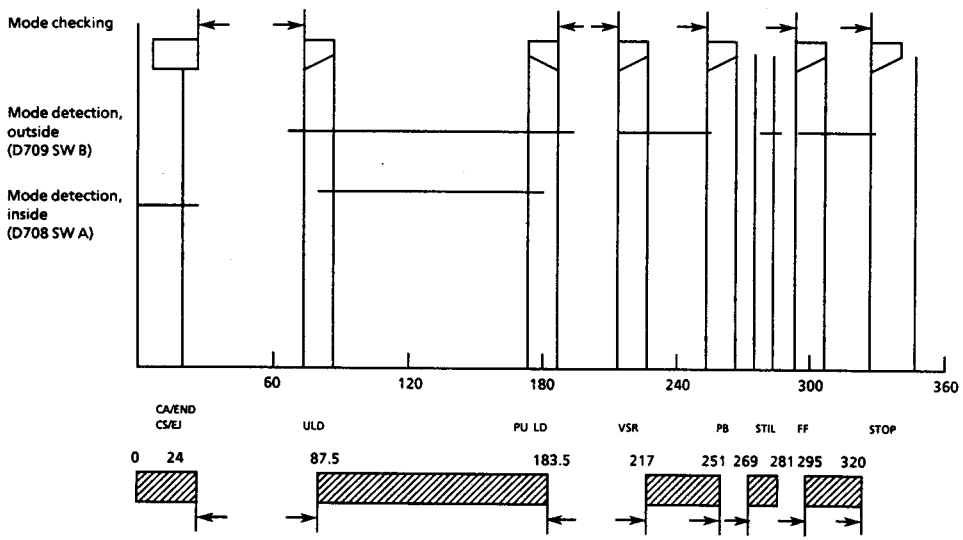
1. Receive the E12 channel signal (colour bar signal at 87.5% modulated.) at input field strength: 70dBμV of antenna terminal.
2. Connect a DC voltmeter to test points TP1503 (+) and TP1501 (−).
3. Adjust VR001 (AGC control) in the IF pack so that the voltage be specified.

6. MECHANISM OPERATION FLOW CHART AND TROUBLESHOOTING GUIDE

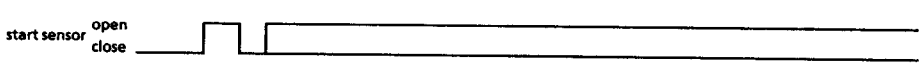
MECHANISM OPERATION FLOWCHART

* This flowchart describes the outline of the mechanism's operation, but does not give its details.

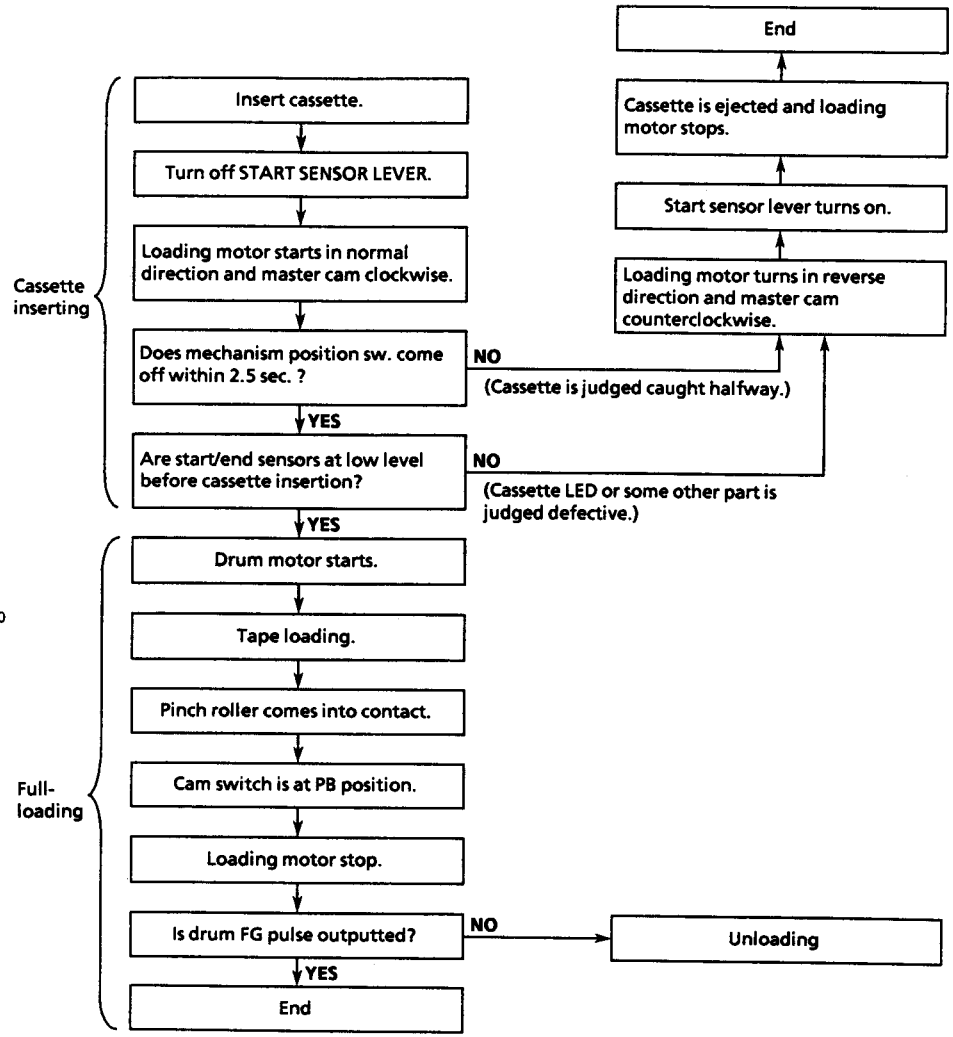
Cam movement chart



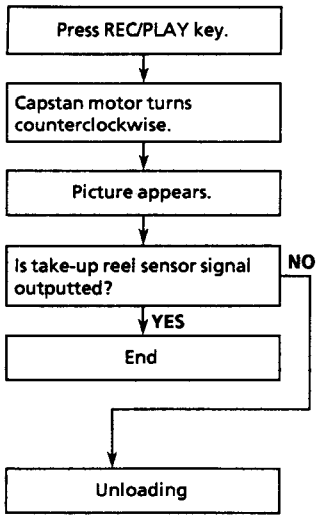
	CS/EJ						ULD	PU LD			VSR		PB	STL		FF		STOP
Mode detection, outside	0	0	0	0	0	1	1	1	1	0	1	1	0	1	1 0	1	1	0
Mode detection, inside	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0 0	0	0	0
S sensor	1	1	0	1	1 or 0													



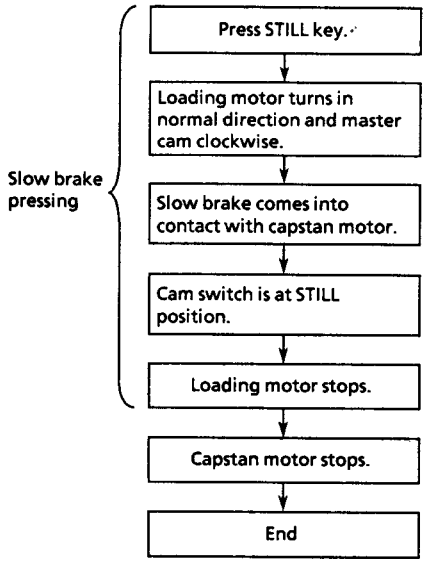
CASSETTE INSERTION → STOP


Cassette inserting
Insert cassette.
Turn off START SENSOR LEVER.
Loading motor starts in normal direction and master cam clockwise.
Does mechanism position sw. come off within 2.5 sec. ?
NO
(Cassette is judged caught halfway.)
YES
Are start/end sensors at low level before cassette insertion?
NO
(Cassette LED or some other part is judged defective.)
YES
Full-loading
Drum motor starts.
Tape loading.
Pinch roller comes into contact.
Cam switch is at PB position.
Loading motor stop.
Is drum FG pulse outputted?
NO
Unloading
YES
End
Loading motor turns in reverse direction and master cam counterclockwise.
Start sensor lever turns on.
Cassette is ejected and loading motor stops.
End

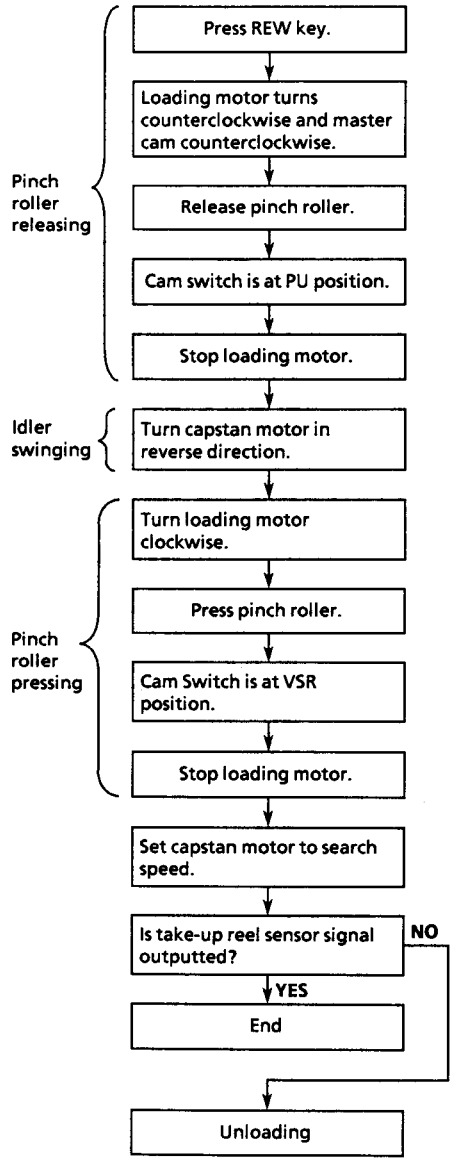
STOP → REC/PLAY



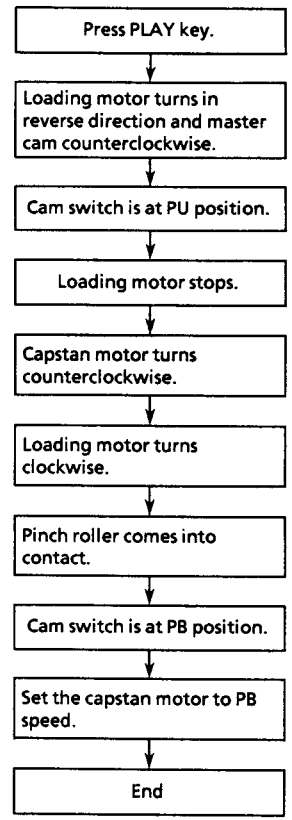
PLAY → STILL


Slow brake pressing
Press STILL key.
Loading motor turns in normal direction and master cam clockwise.
Slow brake comes into contact with capstan motor.
Cam switch is at STILL position.
Loading motor stops.
Capstan motor stops.
End

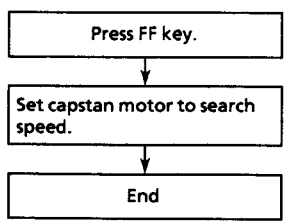
PLAY → VSR



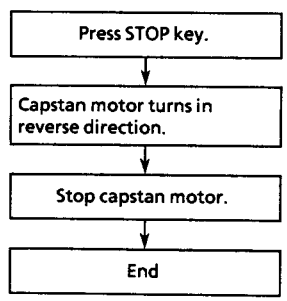
VSR → PLAY


Press PLAY key.
Loading motor turns in reverse direction and master cam counterclockwise.
Cam switch is at PU position.
Loading motor stops.
Capstan motor turns counterclockwise.
Loading motor turns clockwise.
Pinch roller comes into contact.
Cam switch is at PB position.
Set the capstan motor to PB speed.
End

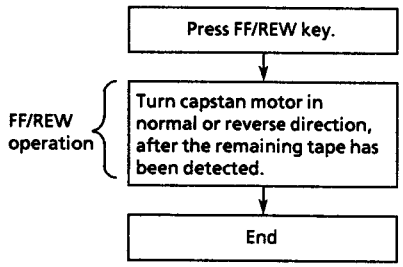
PLAY → VSF



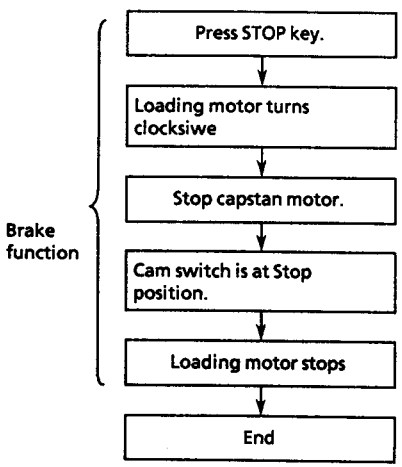
REC/PLAY → STOP



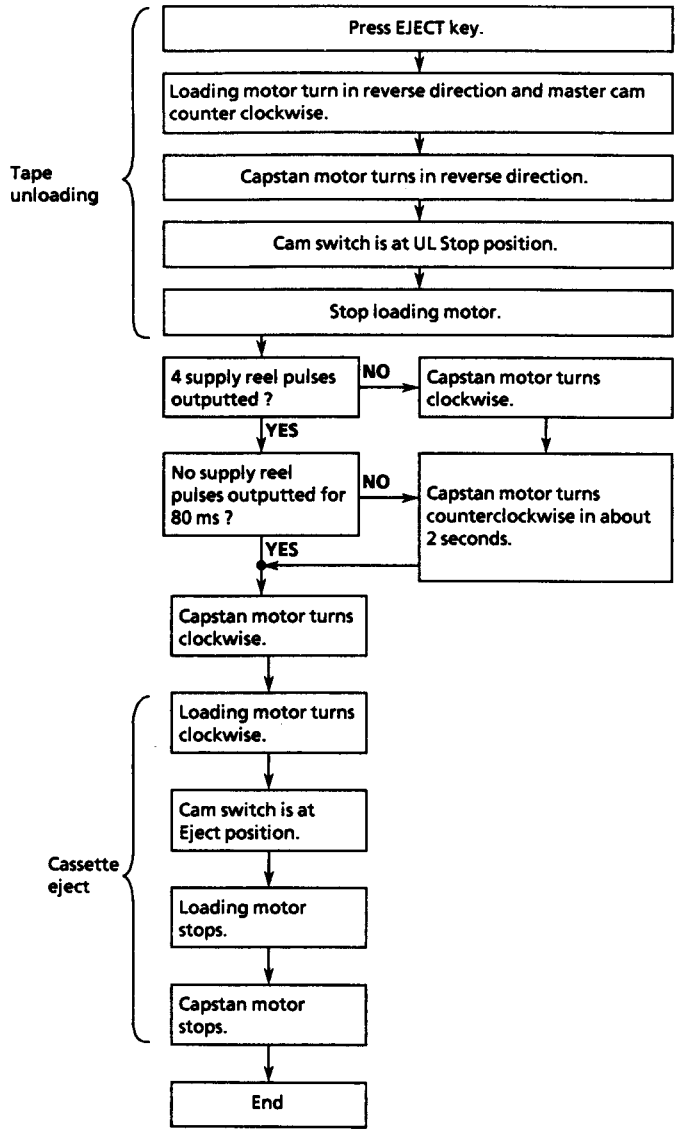
STOP → FF/REW


Press FF/REW key.
FF/REW operation
Turn capstan motor in normal or reverse direction, after the remaining tape has been detected.
End

FF/REW → STOP

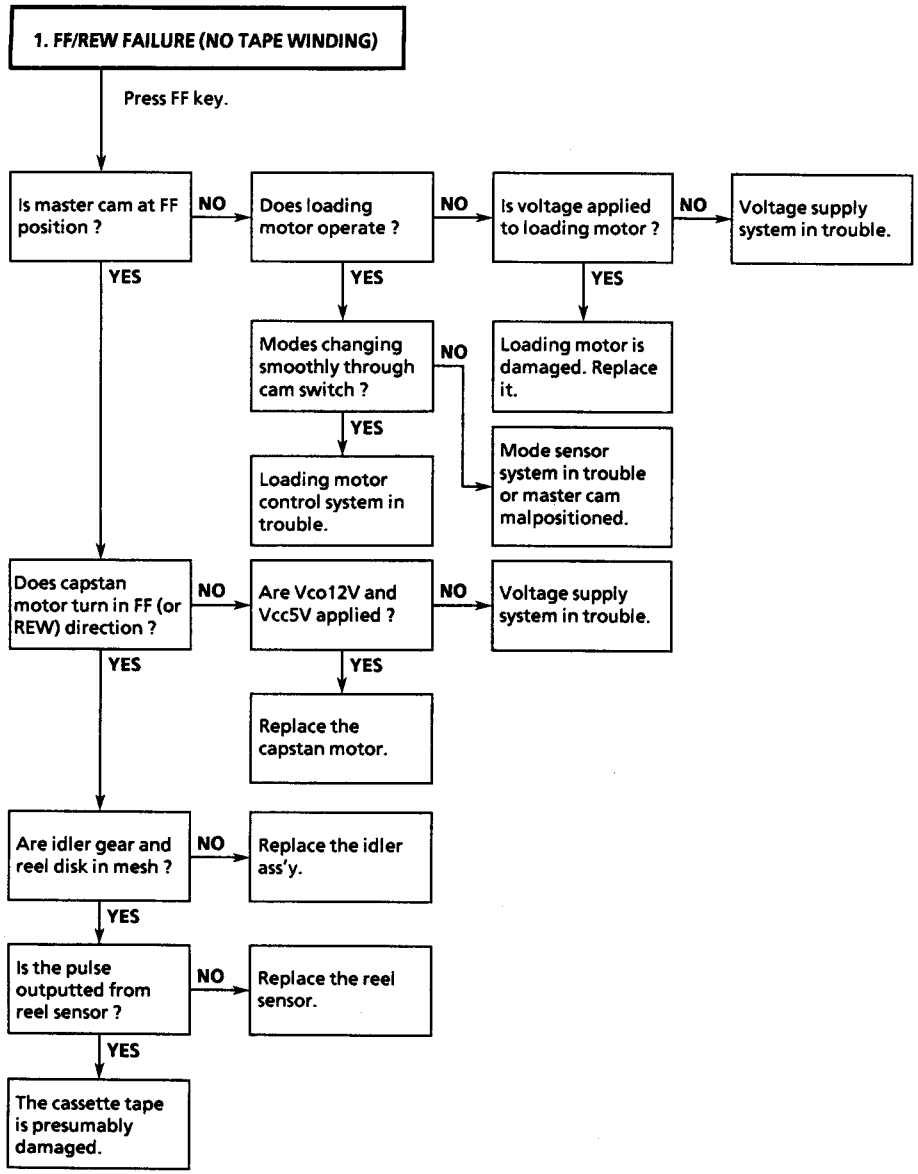


STOP →CASSETTE EJECT

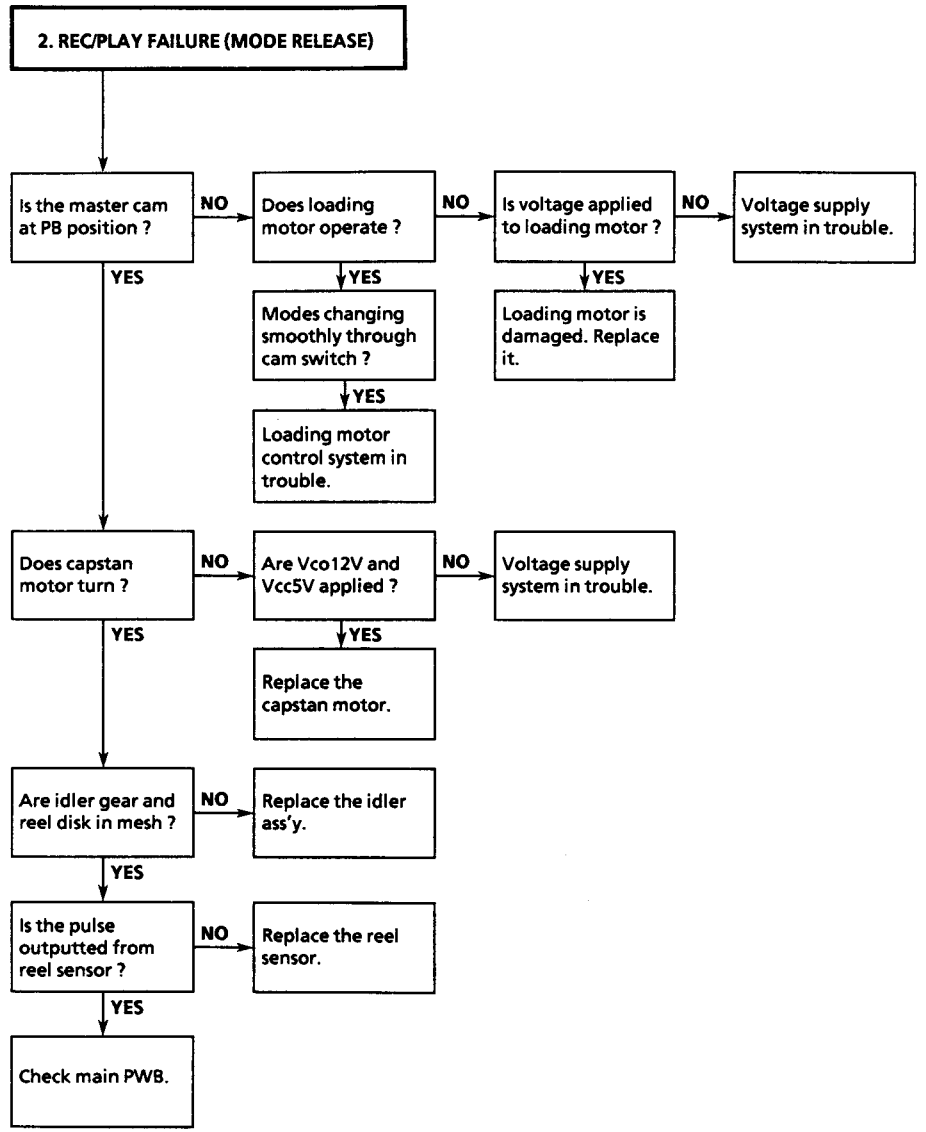

Press EJECT key.
Loading motor turn in reverse direction and master cam counter clockwise.
Capstan motor turns in reverse direction.
Cam switch is at UL Stop position.
Stop loading motor.
Tape unloading
4 supply reel pulses outputted ?
NO
Capstan motor turns clockwise.
YES
No supply reel pulses outputted for 80 ms ?
NO
Capstan motor turns counterclockwise in about 2 seconds.
YES
Capstan motor turns clockwise.
Loading motor turns clockwise.
Cam switch is at Eject position.
Loading motor stops.
Capstan motor stops.
Cassette eject
End

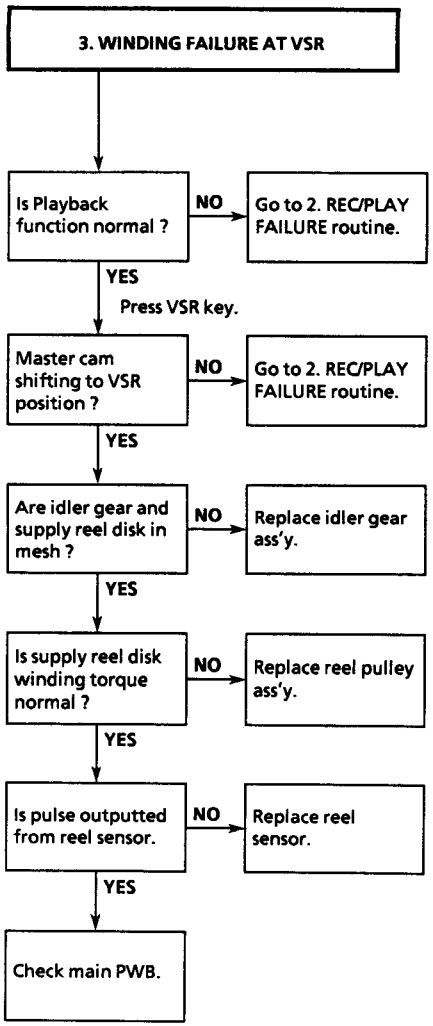
MECHANISM TROUBLESHOOTING

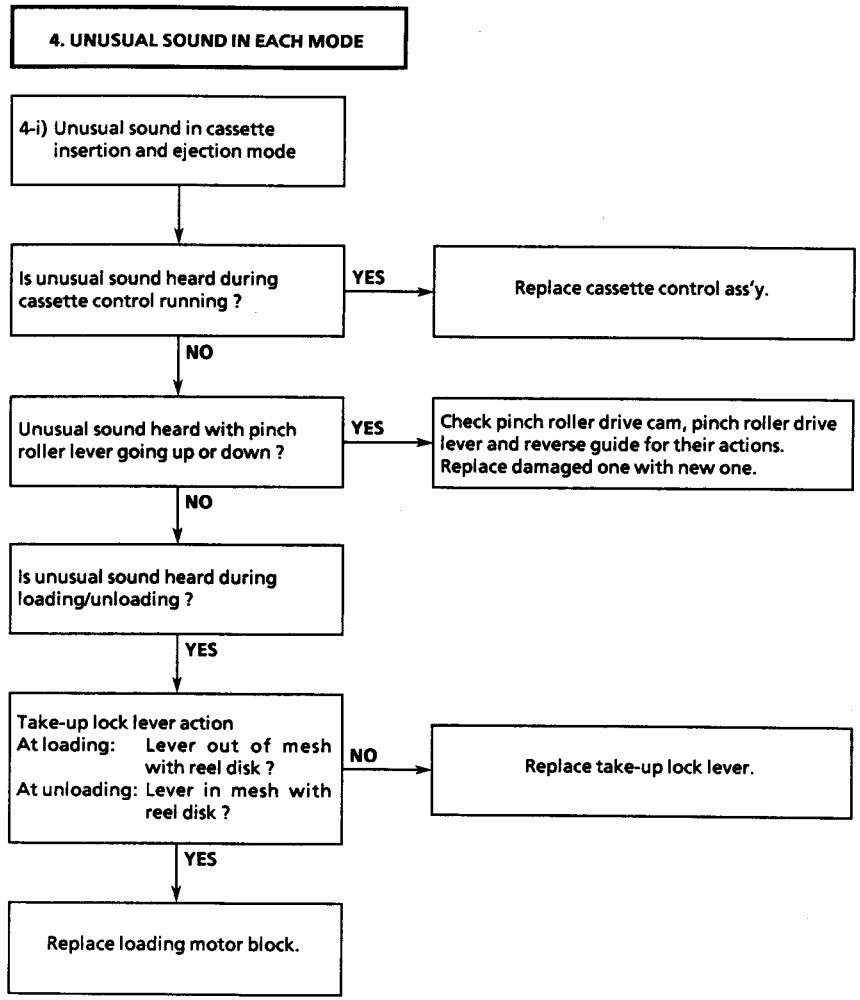
1. FF/REW FAILURE (NO TAPE WINDING)

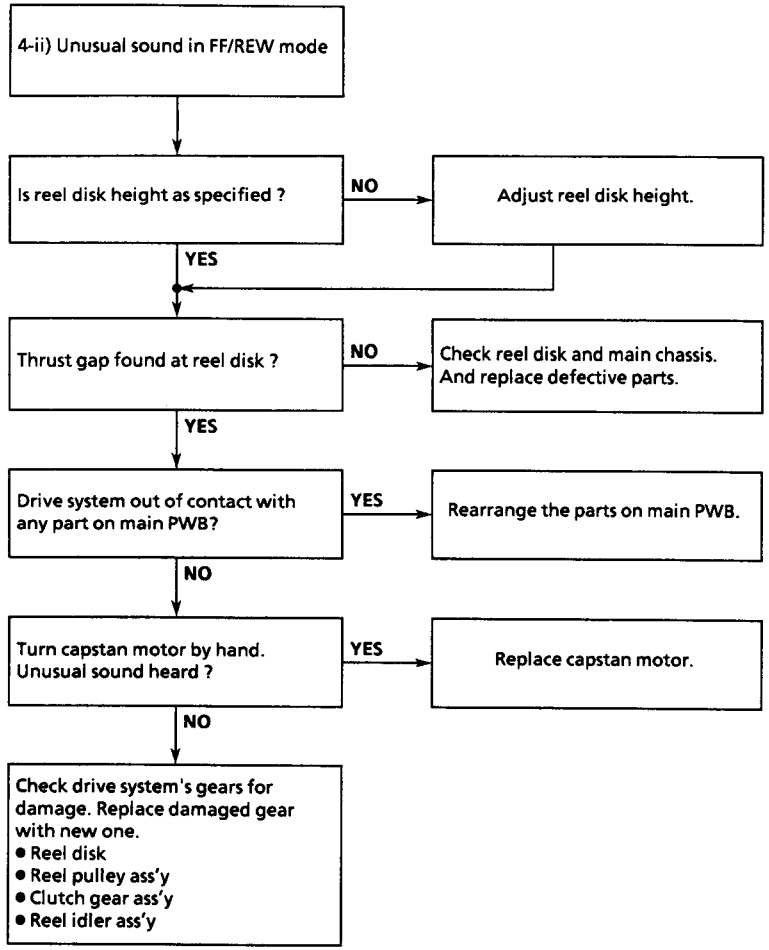


2. REC/PLAY FAILURE (MODE RELEASE)



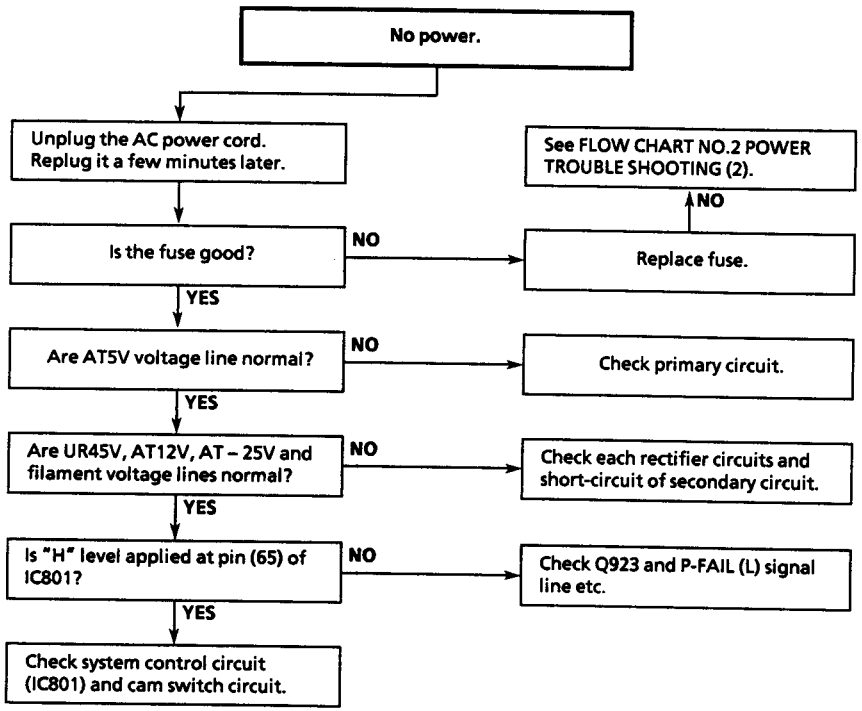

3. WINDING FAILURE AT VSR
Is Playback function normal ?
NO
Go to 2. REC/PLAY FAILURE routine.
YES
Press VSR key.
Master cam shifting to VSR position ?
NO
Go to 2. REC/PLAY FAILURE routine.
YES
Are idler gear and supply reel disk in mesh ?
NO
Replace idler gear ass'y.
YES
Is supply reel disk winding torque normal ?
NO
Replace reel pulley ass'y.
YES
Is pulse outputted from reel sensor.
NO
Replace reel sensor.
YES
Check main PWB.


4. UNUSUAL SOUND IN EACH MODE
4-i) Unusual sound in cassette insertion and ejection mode
Is unusual sound heard during cassette control running ?
YES
Replace cassette control ass'y.
NO
Unusual sound heard with pinch roller lever going up or down ?
YES
Check pinch roller drive cam, pinch roller drive lever and reverse guide for their actions. Replace damaged one with new one.
NO
Is unusual sound heard during loading/unloading ?
YES
Take-up lock lever action
At loading: Lever out of mesh with reel disk ?
At unloading: Lever in mesh with reel disk ?
NO
Replace take-up lock lever.
YES
Replace loading motor block.

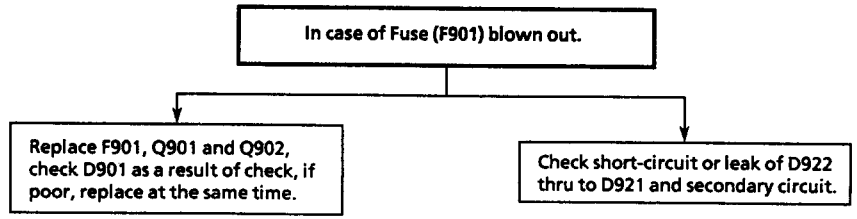

4-ii) Unusual sound in FF/REW mode
Is reel disk height as specified ?
NO
Adjust reel disk height.
YES
Thrust gap found at reel disk ?
NO
Check reel disk and main chassis. And replace defective parts.
YES
Drive system out of contact with any part on main PWB?
YES
Rearrange the parts on main PWB.
NO
Turn capstan motor by hand. Unusual sound heard ?
YES
Replace capstan motor.
NO
Check drive system's gears for damage. Replace damaged gear with new one.
• Reel disk
• Reel pulley ass'y
• Clutch gear ass'y
• Reel idler ass'y

7. TROUBLESHOOTING

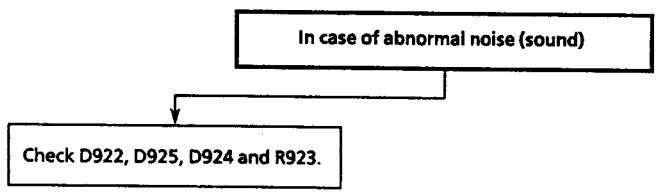
FLOW CHART NO.1 POWER TROUBLESHOOTING (1)


No power.
Unplug the AC power cord. Replug it a few minutes later.
See FLOW CHART NO.2 POWER TROUBLE SHOOTING (2).
NO
Is the fuse good?
NO
Replace fuse.
YES
Are AT5V voltage line normal?
NO
Check primary circuit.
YES
Are UR45V, AT12V, AT – 25V and filament voltage lines normal?
NO
Check each rectifier circuits and short-circuit of secondary circuit.
YES
Is "H" level applied at pin (65) of IC801?
NO
Check Q923 and P-FAIL (L) signal line etc.
YES
Check system control circuit (IC801) and cam switch circuit.

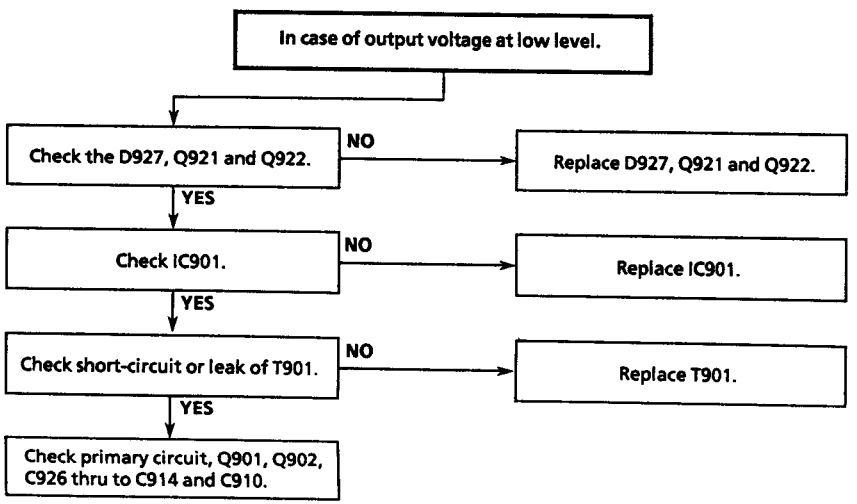
FLOW CHART NO.2 POWER TROUBLESHOOTING (2)


In case of Fuse (F901) blown out.
Replace F901, Q901 and Q902, check D901 as a result of check, if poor, replace at the same time.
Check short-circuit or leak of D922 thru to D921 and secondary circuit.

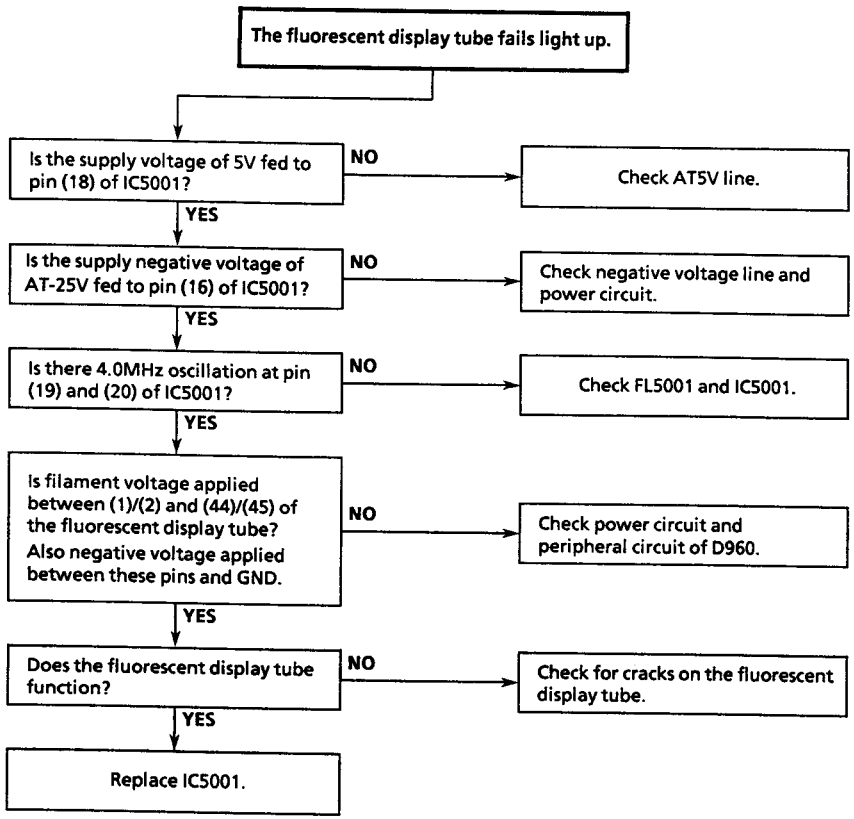
FLOW CHART NO.3 POWER TROUBLESHOOTING (3)



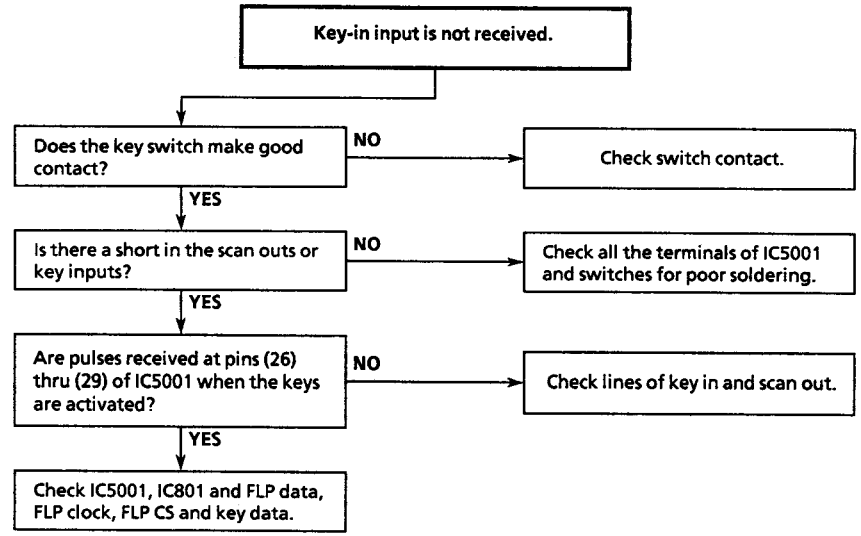
FLOW CHART NO.4 POWER TROUBLESHOOTING (4)



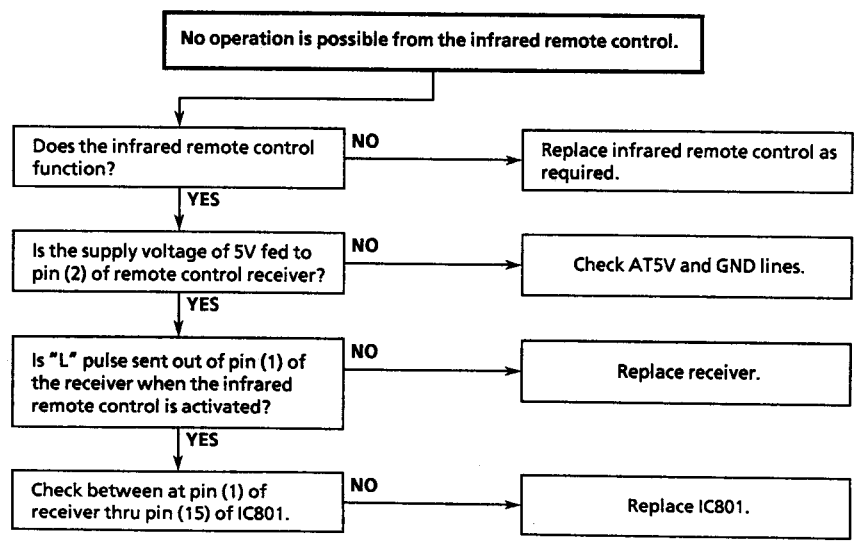
FLOW CHART NO.5 TIMER (1) TROUBLESHOOTING


The fluorescent display tube fails light up.
Is the supply voltage of 5V fed to pin (18) of IC5001?
NO
Check AT5V line.
YES
Is the supply negative voltage of AT-25V fed to pin (16) of IC5001?
NO
Check negative voltage line and power circuit.
YES
Is there 4.0MHz oscillation at pin (19) and (20) of IC5001?
NO
Check FL5001 and IC5001.
YES
Is filament voltage applied between (1)/(2) and (44)/(45) of the fluorescent display tube?
Also negative voltage applied between these pins and GND.
NO
Check power circuit and peripheral circuit of D960.
YES
Does the fluorescent display tube function?
NO
Check for cracks on the fluorescent display tube.
YES
Replace IC5001.

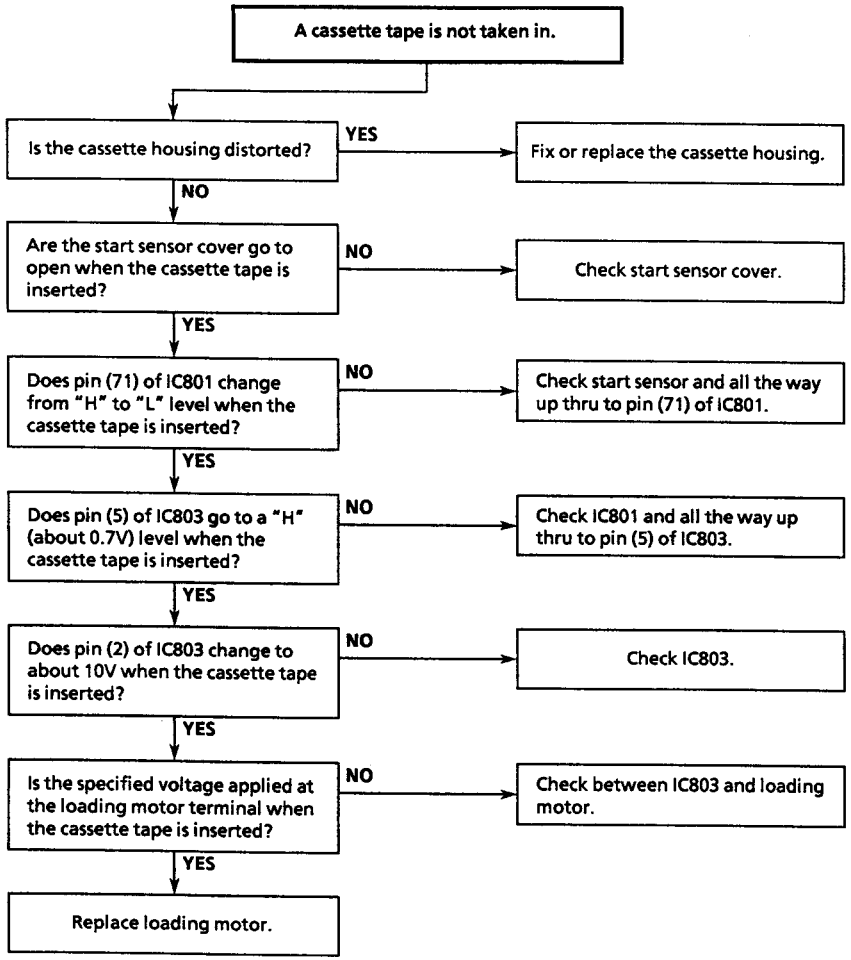
FLOW CHART NO.6 TIMER (2) TROUBLESHOOTING


Key-in input is not received.
Does the key switch make good contact?
NO
Check switch contact.
YES
Is there a short in the scan outs or key inputs?
NO
Check all the terminals of IC5001 and switches for poor soldering.
YES
Are pulses received at pins (26) thru (29) of IC5001 when the keys are activated?
NO
Check lines of key in and scan out.
YES
Check IC5001, IC801 and FLP data, FLP clock, FLP CS and key data.

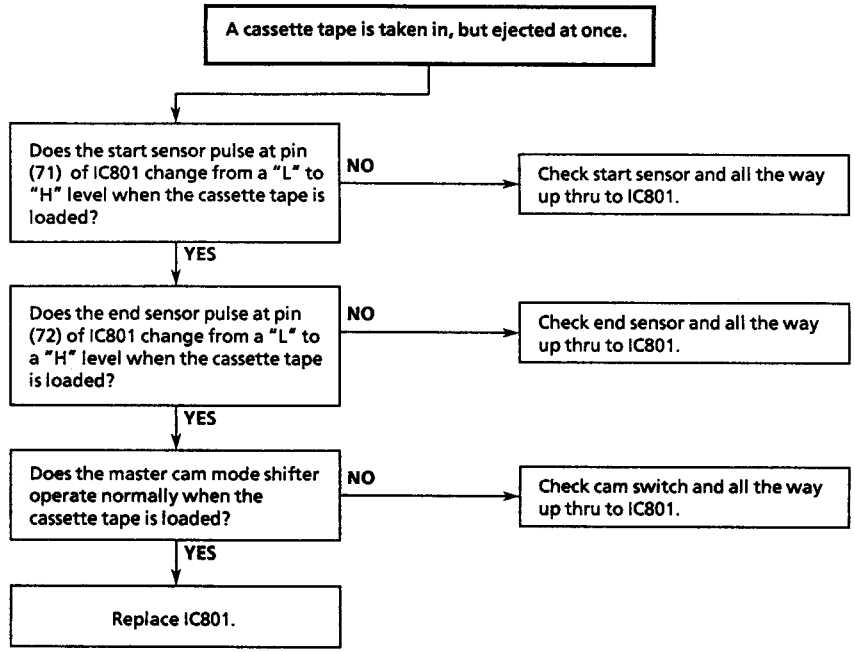
FLOW CHART NO.7 INFRARED R/C TROUBLESHOOTING


No operation is possible from the infrared remote control.
Does the infrared remote control function?
NO
Replace infrared remote control as required.
YES
Is the supply voltage of 5V fed to pin (2) of remote control receiver?
NO
Check AT5V and GND lines.
YES
Is "L" pulse sent out of pin (1) of the receiver when the infrared remote control is activated?
NO
Replace receiver.
YES
Check between at pin (1) of receiver thru pin (15) of IC801.
NO
Replace IC801.

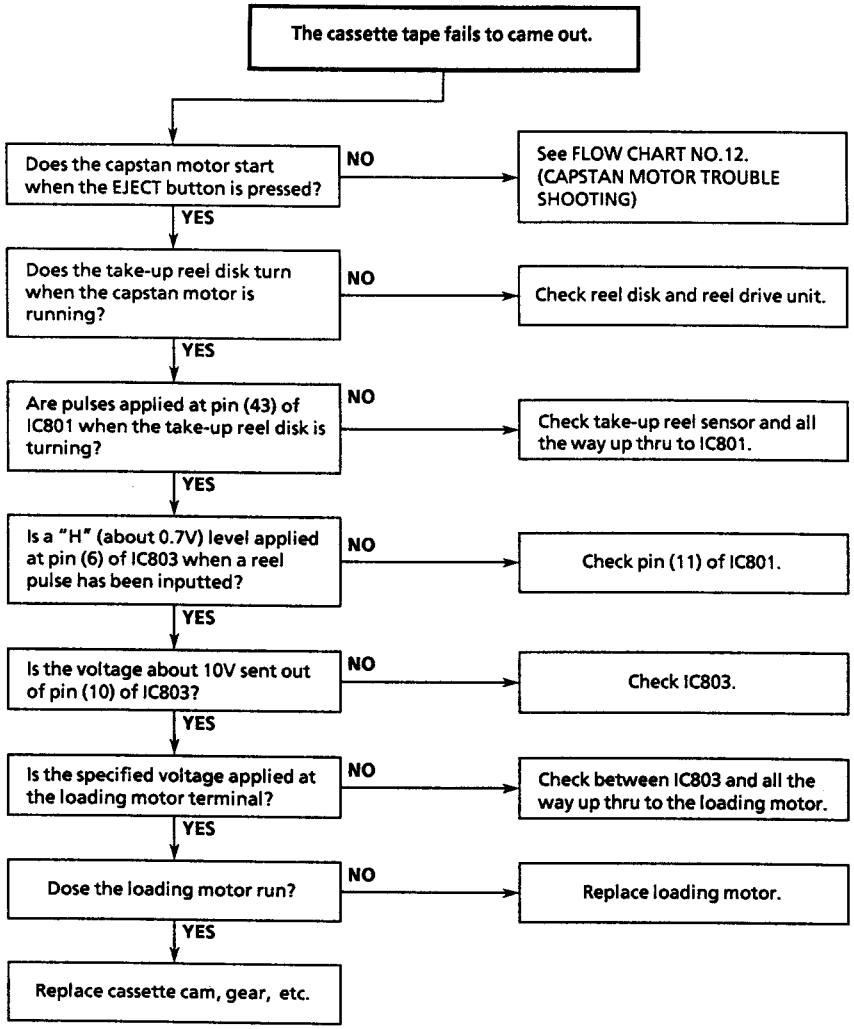
FLOW CHART NO.8 CASSETTE CONTROL TROUBLESHOOTING (1)


A cassette tape is not taken in.
Is the cassette housing distorted?
YES
Fix or replace the cassette housing.
NO
Are the start sensor cover go to open when the cassette tape is inserted?
NO
Check start sensor cover.
YES
Does pin (71) of IC801 change from "H" to "L" level when the cassette tape is inserted?
NO
Check start sensor and all the way up thru to pin (71) of IC801.
YES
Does pin (5) of IC803 go to a "H" (about 0.7V) level when the cassette tape is inserted?
NO
Check IC801 and all the way up thru to pin (5) of IC803.
YES
Does pin (2) of IC803 change to about 10V when the cassette tape is inserted?
NO
Check IC803.
YES
Is the specified voltage applied at the loading motor terminal when the cassette tape is inserted?
NO
Check between IC803 and loading motor.
YES
Replace loading motor.

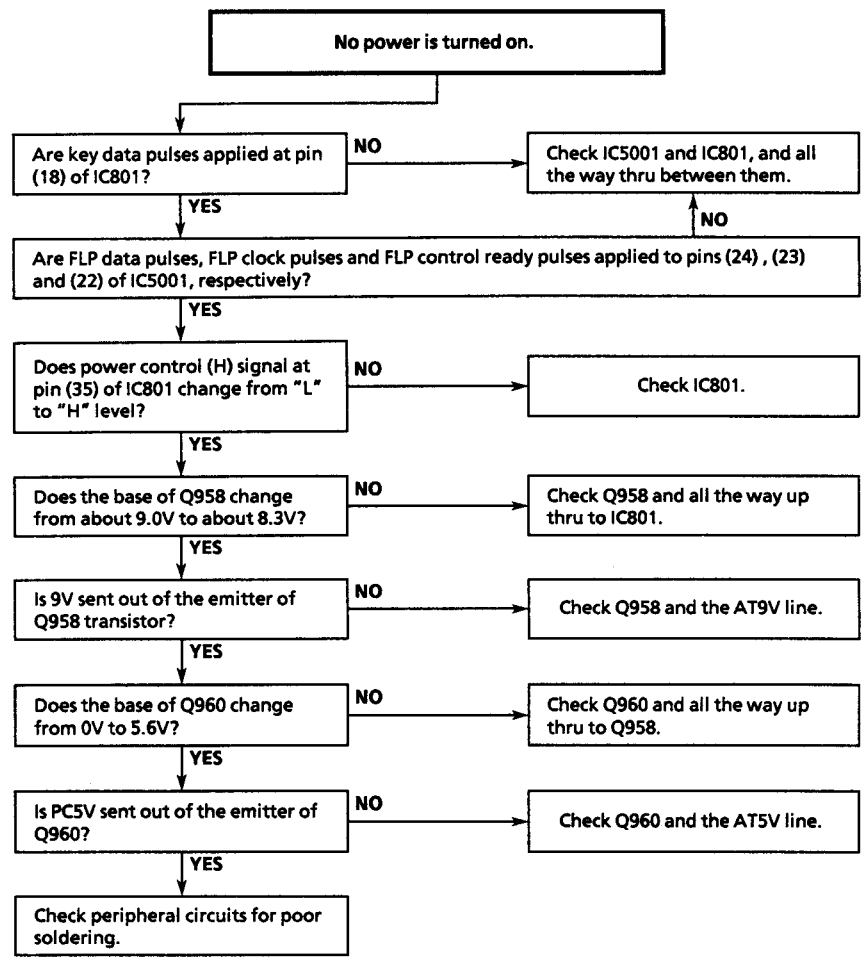
FLOW CHART NO.9 CASSETTE CONTROL TROUBLESHOOTING (2)


A cassette tape is taken in, but ejected at once.
Does the start sensor pulse at pin (71) of IC801 change from a "L" to "H" level when the cassette tape is loaded?
NO
Check start sensor and all the way up thru to IC801.
YES
Does the end sensor pulse at pin (72) of IC801 change from a "L" to a "H" level when the cassette tape is loaded?
NO
Check end sensor and all the way up thru to IC801.
YES
Does the master cam mode shifter operate normally when the cassette tape is loaded?
NO
Check cam switch and all the way up thru to IC801.
YES
Replace IC801.

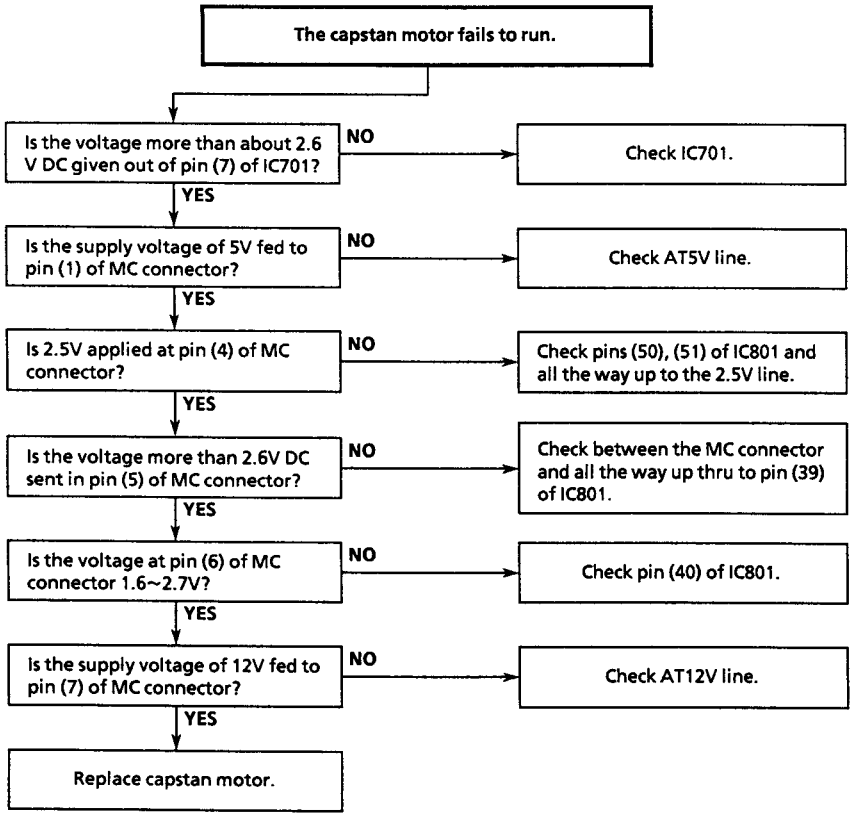
FLOW CHART NO.10 LOADING MOTOR AND EJECT TROUBLESHOOTING


The cassette tape fails to came out.
Does the capstan motor start when the EJECT button is pressed?
NO
See FLOW CHART NO.12. (CAPSTAN MOTOR TROUBLE SHOOTING)
YES
Does the take-up reel disk turn when the capstan motor is running?
NO
Check reel disk and reel drive unit.
YES
Are pulses applied at pin (43) of IC801 when the take-up reel disk is turning?
NO
Check take-up reel sensor and all the way up thru to IC801.
YES
Is a "H" (about 0.7V) level applied at pin (6) of IC803 when a reel pulse has been inputted?
NO
Check pin (11) of IC801.
YES
Is the voltage about 10V sent out of pin (10) of IC803?
NO
Check IC803.
YES
Is the specified voltage applied at the loading motor terminal?
NO
Check between IC803 and all the way up thru to the loading motor.
YES
Dose the loading motor run?
NO
Replace loading motor.
YES
Replace cassette cam, gear, etc.

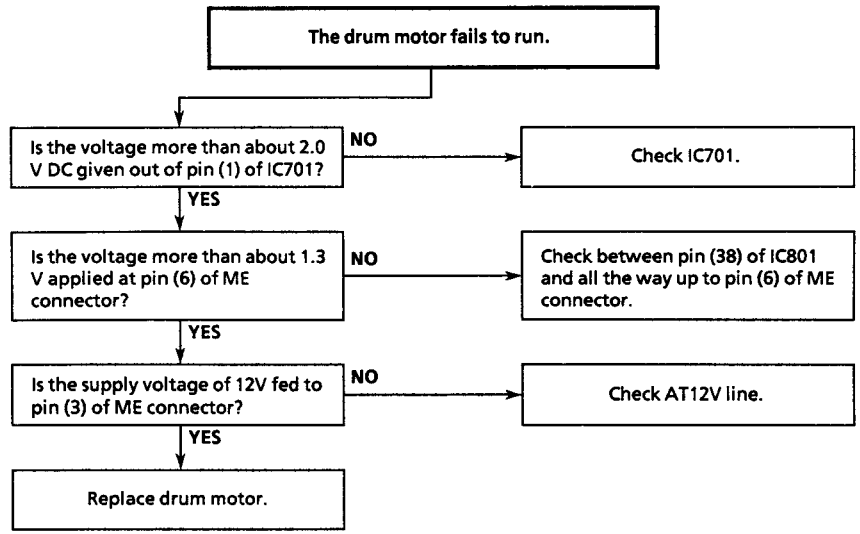
FLOW CHART NO.11 SYSTEM CONTROL TROUBLESHOOTING


No power is turned on.
Are key data pulses applied at pin (18) of IC801?
NO
Check IC5001 and IC801, and all the way thru between them.
YES
NO
Are FLP data pulses, FLP clock pulses and FLP control ready pulses applied to pins (24) , (23) and (22) of IC5001, respectively?
YES
Does power control (H) signal at pin (35) of IC801 change from "L" to "H" level?
NO
Check IC801.
YES
Does the base of Q958 change from about 9.0V to about 8.3V?
NO
Check Q958 and all the way up thru to IC801.
YES
Is 9V sent out of the emitter of Q958 transistor?
NO
Check Q958 and the AT9V line.
YES
Does the base of Q960 change from 0V to 5.6V?
NO
Check Q960 and all the way up thru to Q958.
YES
Is PC5V sent out of the emitter of Q960?
NO
Check Q960 and the AT5V line.
YES
Check peripheral circuits for poor soldering.

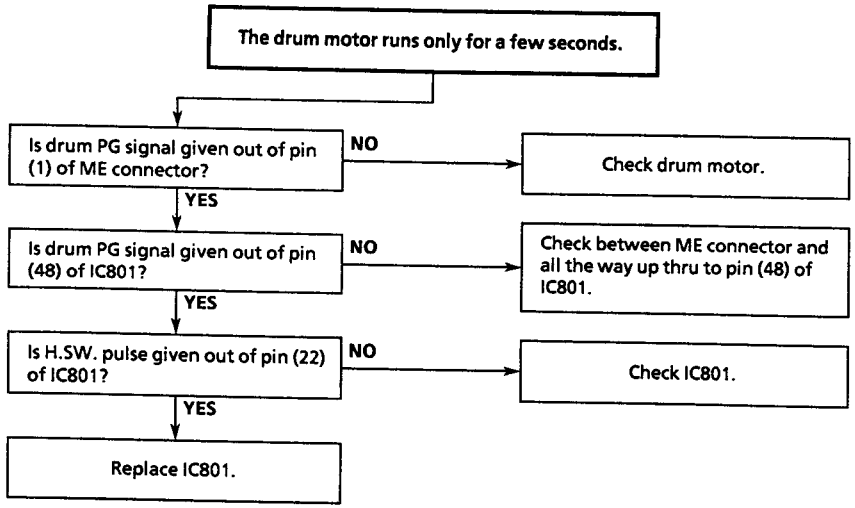
FLOW CHART NO.12 CAPSTAN MOTOR TROUBLESHOOTING


The capstan motor fails to run.
Is the voltage more than about 2.6 V DC given out of pin (7) of IC701?
NO
Check IC701.
YES
Is the supply voltage of 5V fed to pin (1) of MC connector?
NO
Check AT5V line.
YES
Is 2.5V applied at pin (4) of MC connector?
NO
Check pins (50), (51) of IC801 and all the way up to the 2.5V line.
YES
Is the voltage more than 2.6V DC sent in pin (5) of MC connector?
NO
Check between the MC connector and all the way up thru to pin (39) of IC801.
YES
Is the voltage at pin (6) of MC connector 1.6~2.7V?
NO
Check pin (40) of IC801.
YES
Is the supply voltage of 12V fed to pin (7) of MC connector?
NO
Check AT12V line.
YES
Replace capstan motor.

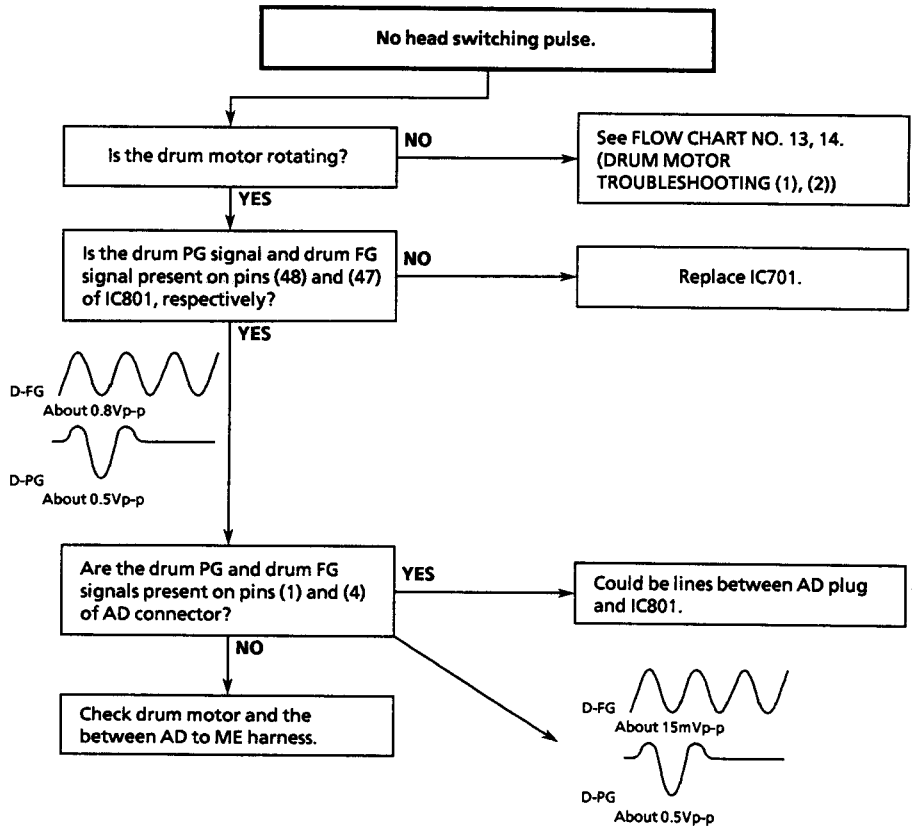
FLOW CHART NO.13 DRUM MOTOR TROUBLESHOOTING (1)


The drum motor fails to run.
Is the voltage more than about 2.0 V DC given out of pin (1) of IC701?
NO
Check IC701.
YES
Is the voltage more than about 1.3 V applied at pin (6) of ME connector?
NO
Check between pin (38) of IC801 and all the way up to pin (6) of ME connector.
YES
Is the supply voltage of 12V fed to pin (3) of ME connector?
NO
Check AT12V line.
YES
Replace drum motor.

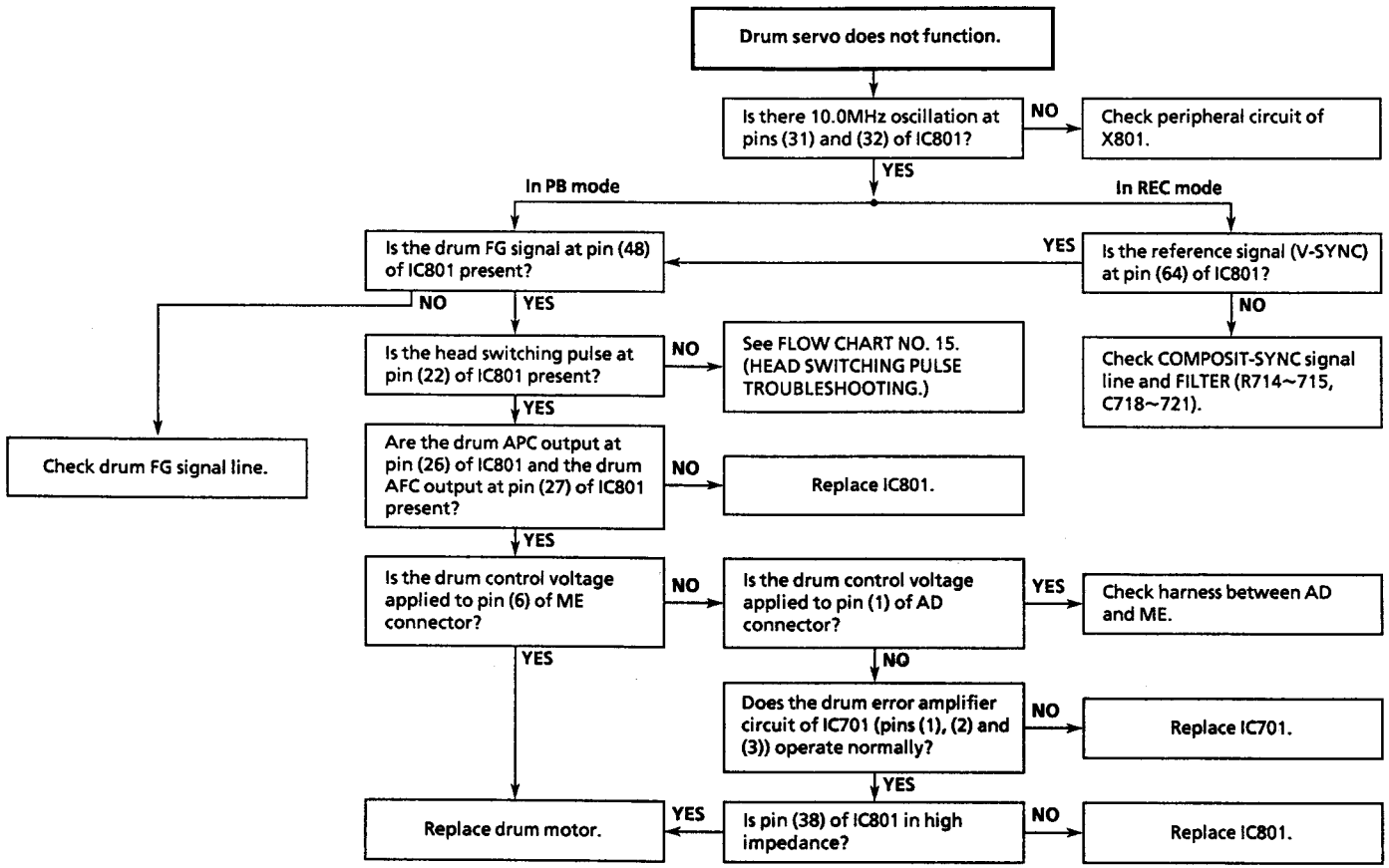
FLOW CHART NO.14 DRUM MOTOR TROUBLESHOOTING (2)


The drum motor runs only for a few seconds.
Is drum PG signal given out of pin (1) of ME connector?
NO
Check drum motor.
YES
Is drum PG signal given out of pin (48) of IC801?
NO
Check between ME connector and all the way up thru to pin (48) of IC801.
YES
Is H.SW. pulse given out of pin (22) of IC801?
NO
Check IC801.
YES
Replace IC801.

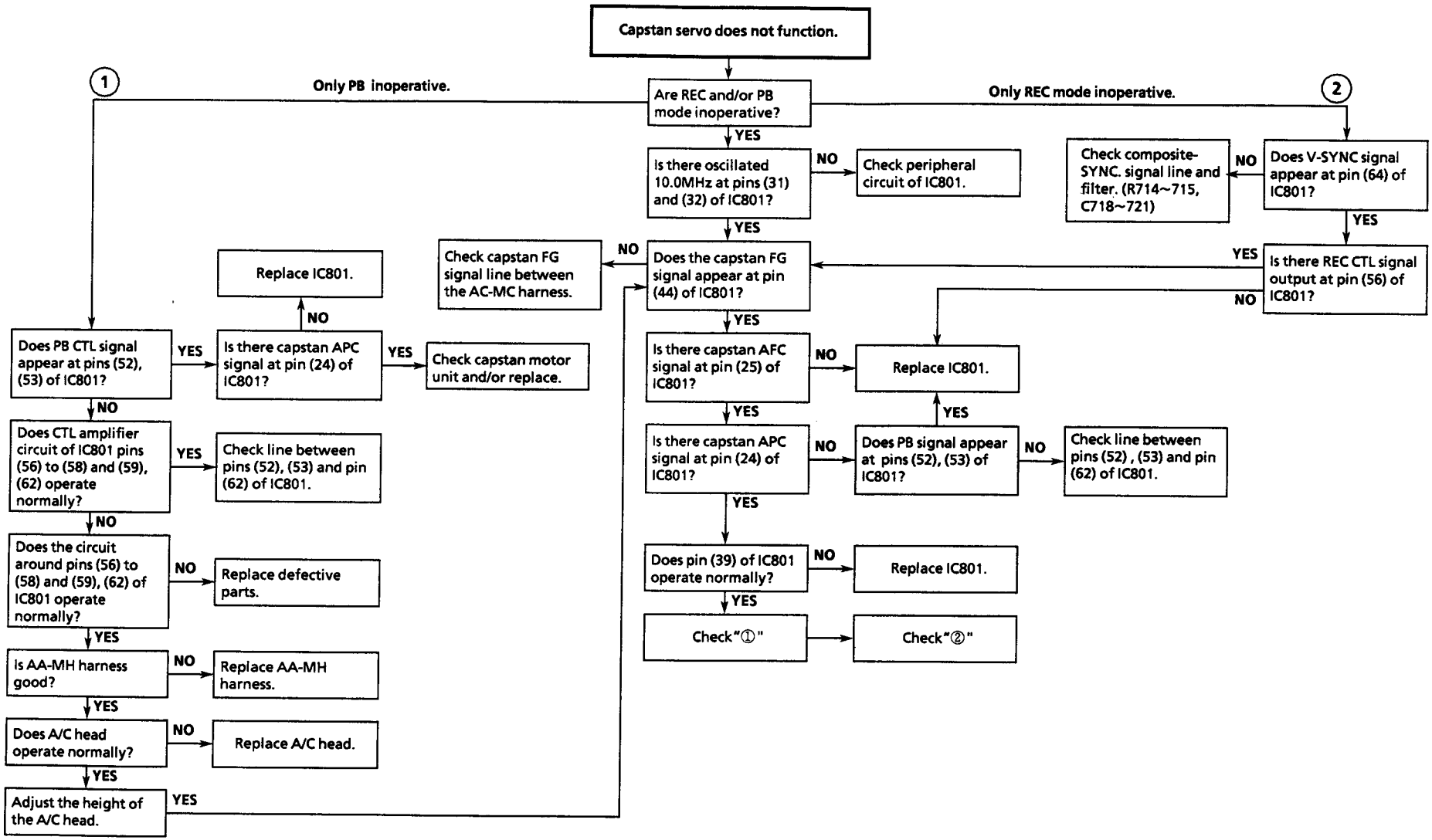
FLOW CHART NO.15 HEAD SWITCHING PULSE TROUBLESHOOTING


No head switching pulse.
Is the drum motor rotating?
NO
See FLOW CHART NO. 13, 14. (DRUM MOTOR TROUBLESHOOTING (1), (2))
YES
Is the drum PG signal and drum FG signal present on pins (48) and (47) of IC801, respectively?
NO
Replace IC701.
YES
D-FG
About 0.8Vp-p
D-PG
About 0.5Vp-p
Are the drum PG and drum FG signals present on pins (1) and (4) of AD connector?
YES
Could be lines between AD plug and IC801.
NO
Check drum motor and the between AD to ME harness.
D-FG
About 15mVp-p
D-PG
About 0.5Vp-p

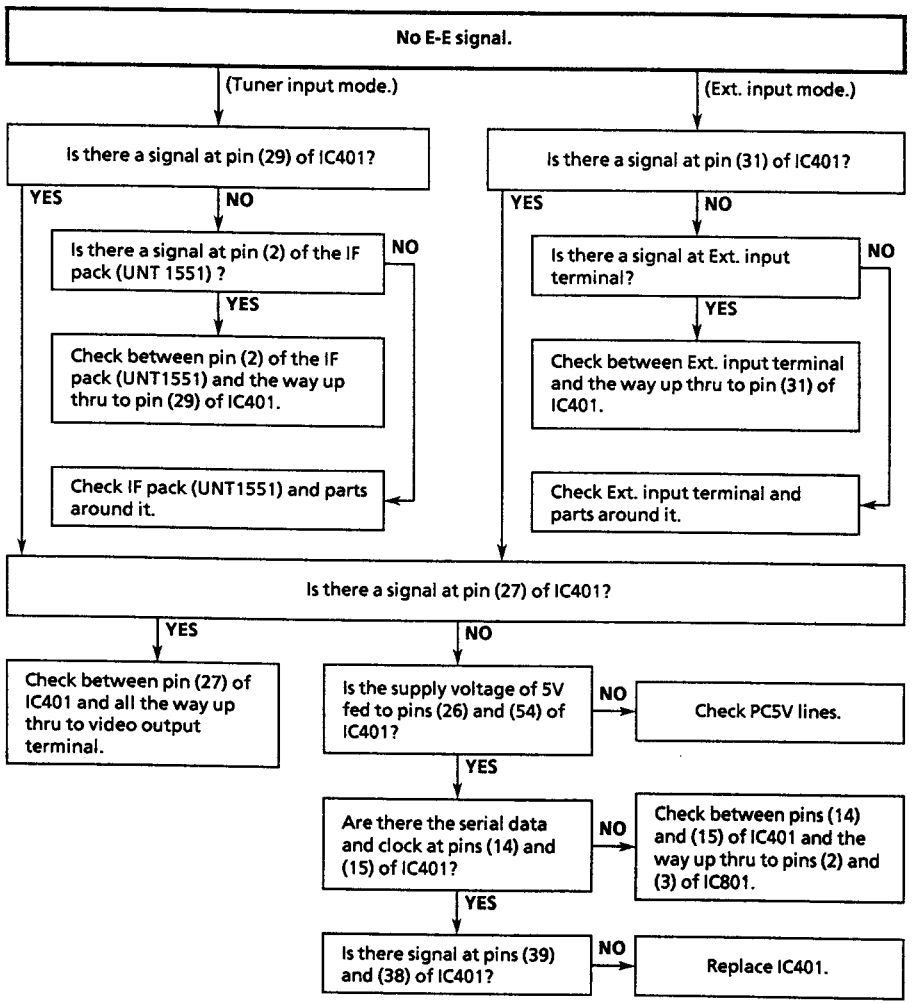
FLOW CHART NO.16 DRUM SERVO TROUBLESHOOTING


Drum servo does not function.
Is there 10.0MHz oscillation at pins (31) and (32) of IC801?
NO
Check peripheral circuit of X801.
YES
In PB mode
In REC mode
Is the drum FG signal at pin (48) of IC801 present?
YES
Is the reference signal (V-SYNC) at pin (64) of IC801?
NO
YES
NO
Is the head switching pulse at pin (22) of IC801 present?
NO
See FLOW CHART NO. 15. (HEAD SWITCHING PULSE TROUBLESHOOTING.)
Check COMPOSIT-SYNC signal line and FILTER (R714~715, C718~721).
YES
Check drum FG signal line.
Are the drum APC output at pin (26) of IC801 and the drum AFC output at pin (27) of IC801 present?
NO
Replace IC801.
YES
Is the drum control voltage applied to pin (6) of ME connector?
NO
Is the drum control voltage applied to pin (1) of AD connector?
YES
Check harness between AD and ME.
YES
NO
Does the drum error amplifier circuit of IC701 (pins (1), (2) and (3)) operate normally?
NO
Replace IC701.
YES
Replace drum motor.
YES
Is pin (38) of IC801 in high impedance?
NO
Replace IC801.

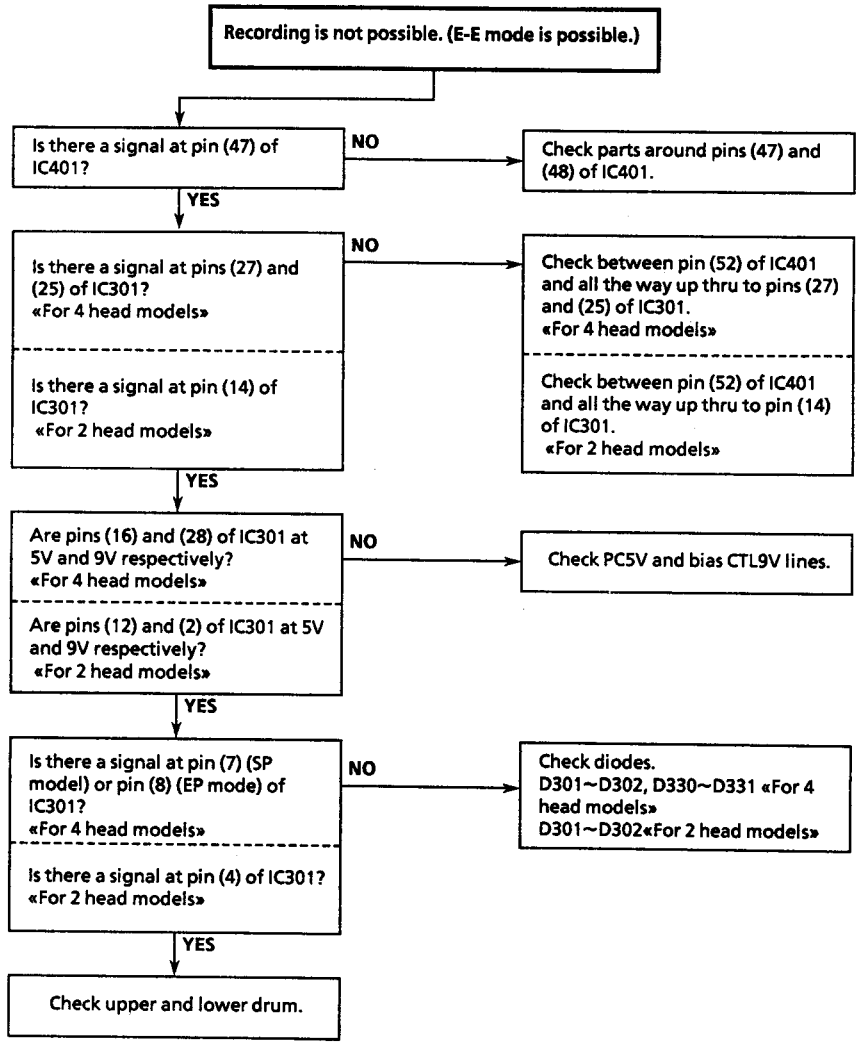
FLOW CHART NO.17 CAPSTAN SERVO TROUBLESHOOTING


Capstan servo does not function.
Are REC and/or PB mode inoperative?
Only PB inoperative.
Only REC mode inoperative.
1
2
YES
Is there oscillated 10.0MHz at pins (31) and (32) of IC801?
NO
Check peripheral circuit of IC801.
YES
Does the capstan FG signal appear at pin (44) of IC801?
NO
Check capstan FG signal line between the AC-MC harness.
YES
Is there capstan AFC signal at pin (25) of IC801?
NO
Replace IC801.
YES
Is there capstan APC signal at pin (24) of IC801?
NO
Does PB signal appear at pins (52), (53) of IC801?
NO
Check line between pins (52) , (53) and pin (62) of IC801.
YES
Does pin (39) of IC801 operate normally?
NO
Replace IC801.
YES
Check"①"
Check"②"
Check composite-SYNC. signal line and filter. (R714~715, C718~721)
NO
Does V-SYNC signal appear at pin (64) of IC801?
YES
Is there REC CTL signal output at pin (56) of IC801?
YES
NO
Does PB CTL signal appear at pins (52), (53) of IC801?
YES
Is there capstan APC signal at pin (24) of IC801?
NO
Replace IC801.
YES
Check capstan motor unit and/or replace.
NO
Does CTL amplifier circuit of IC801 pins (56) to (58) and (59), (62) operate normally?
YES
Check line between pins (52), (53) and pin (62) of IC801.
NO
Does the circuit around pins (56) to (58) and (59), (62) of IC801 operate normally?
NO
Replace defective parts.
YES
Is AA-MH harness good?
NO
Replace AA-MH harness.
YES
Does A/C head operate normally?
NO
Replace A/C head.
YES
Adjust the height of the A/C head.
YES

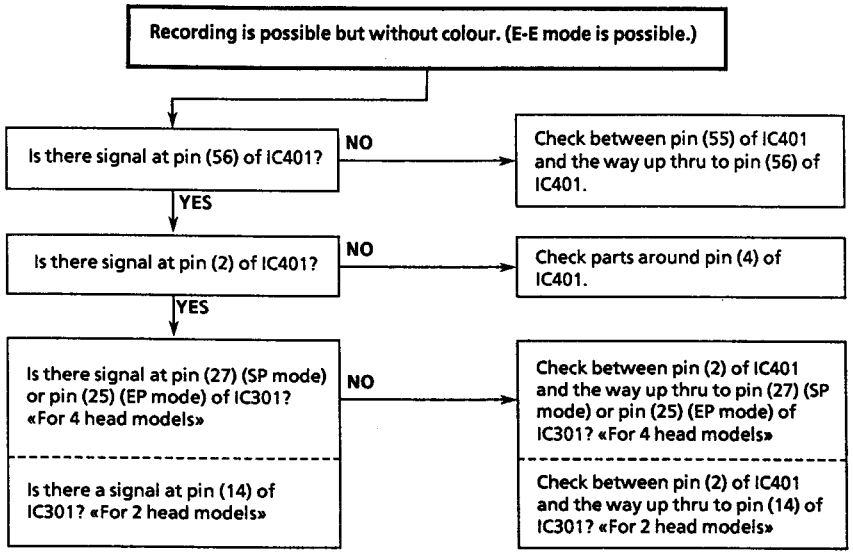
FLOW CHART NO.18 E-E MODE TROUBLESHOOTING


No E-E signal.
(Tuner input mode.)
(Ext. input mode.)
Is there a signal at pin (29) of IC401?
Is there a signal at pin (31) of IC401?
YES
NO
Is there a signal at pin (2) of the IF pack (UNT 1551) ?
Is there a signal at Ext. input terminal?
Check between pin (2) of the IF pack (UNT1551) and the way up thru to pin (29) of IC401.
Check between Ext. input terminal and the way up thru to pin (31) of IC401.
Check IF pack (UNT1551) and parts around it.
Check Ext. input terminal and parts around it.
Is there a signal at pin (27) of IC401?
Check between pin (27) of IC401 and all the way up thru to video output terminal.
Is the supply voltage of 5V fed to pins (26) and (54) of IC401?
Check PC5V lines.
Are there the serial data and clock at pins (14) and (15) of IC401?
Check between pins (14) and (15) of IC401 and the way up thru to pins (2) and (3) of IC801.
Is there signal at pins (39) and (38) of IC401?
Replace IC401.

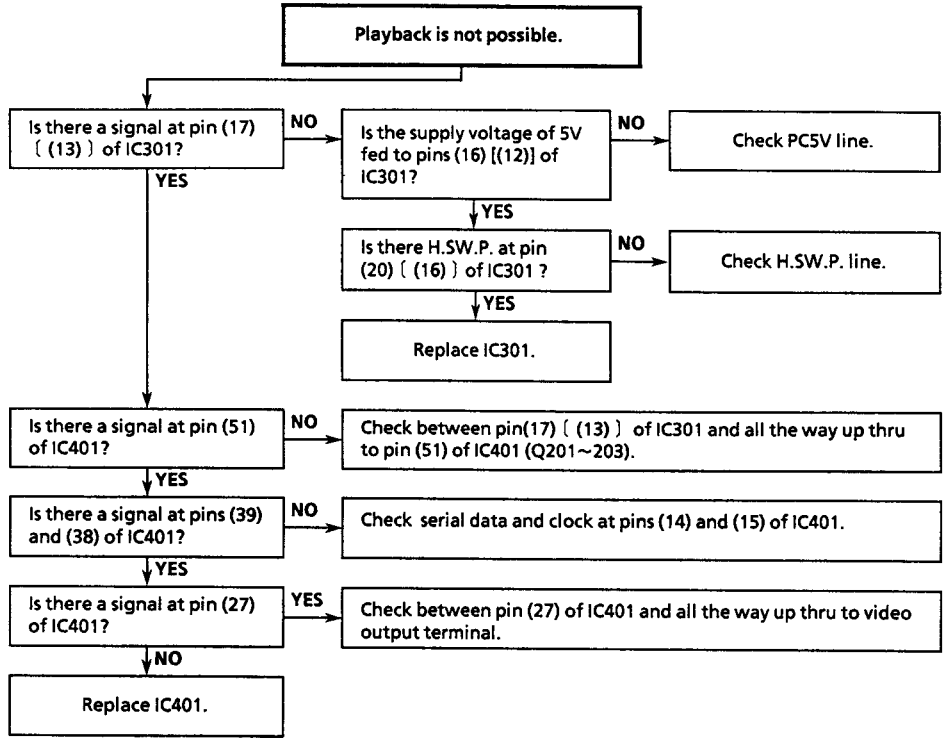
FLOW CHART NO.19 RECORDING MODE (LUMINANCE) TROUBLESHOOTING


Recording is not possible. (E-E mode is possible.)
Is there a signal at pin (47) of IC401?
Check parts around pins (47) and (48) of IC401.
Is there a signal at pins (27) and (25) of IC301?
«For 4 head models»
Is there a signal at pin (14) of IC301?
«For 2 head models»
Check between pin (52) of IC401 and all the way up thru to pins (27) and (25) of IC301.
«For 4 head models»
Check between pin (52) of IC401 and all the way up thru to pin (14) of IC301.
«For 2 head models»
Are pins (16) and (28) of IC301 at 5V and 9V respectively?
«For 4 head models»
Are pins (12) and (2) of IC301 at 5V and 9V respectively?
«For 2 head models»
Check PC5V and bias CTL9V lines.
Is there a signal at pin (7) (SP model) or pin (8) (EP mode) of IC301?
«For 4 head models»
Is there a signal at pin (4) of IC301?
«For 2 head models»
Check diodes.
D301~D302, D330~D331 «For 4 head models»
D301~D302«For 2 head models»
Check upper and lower drum.

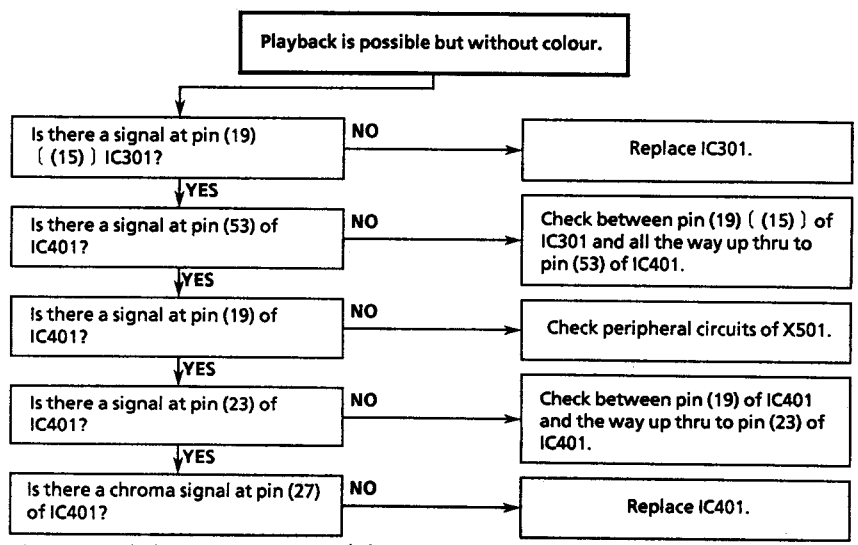
FLOW CHART NO.20 RECORDING MODE (CHROMA) TROUBLESHOOTING


Recording is possible but without colour. (E-E mode is possible.)
Is there signal at pin (56) of IC401?
NO
Check between pin (55) of IC401 and the way up thru to pin (56) of IC401.
YES
Is there signal at pin (2) of IC401?
NO
Check parts around pin (4) of IC401.
YES
Is there signal at pin (27) (SP mode) or pin (25) (EP mode) of IC301? «For 4 head models»
NO
Check between pin (2) of IC401 and the way up thru to pin (27) (SP mode) or pin (25) (EP mode) of IC301? «For 4 head models»
Is there a signal at pin (14) of IC301? «For 2 head models»
Check between pin (2) of IC401 and the way up thru to pin (14) of IC301? «For 2 head models»

FLOW CHART NO.21 PLAYBACK MODE (LUMINANCE) TROUBLESHOOTING

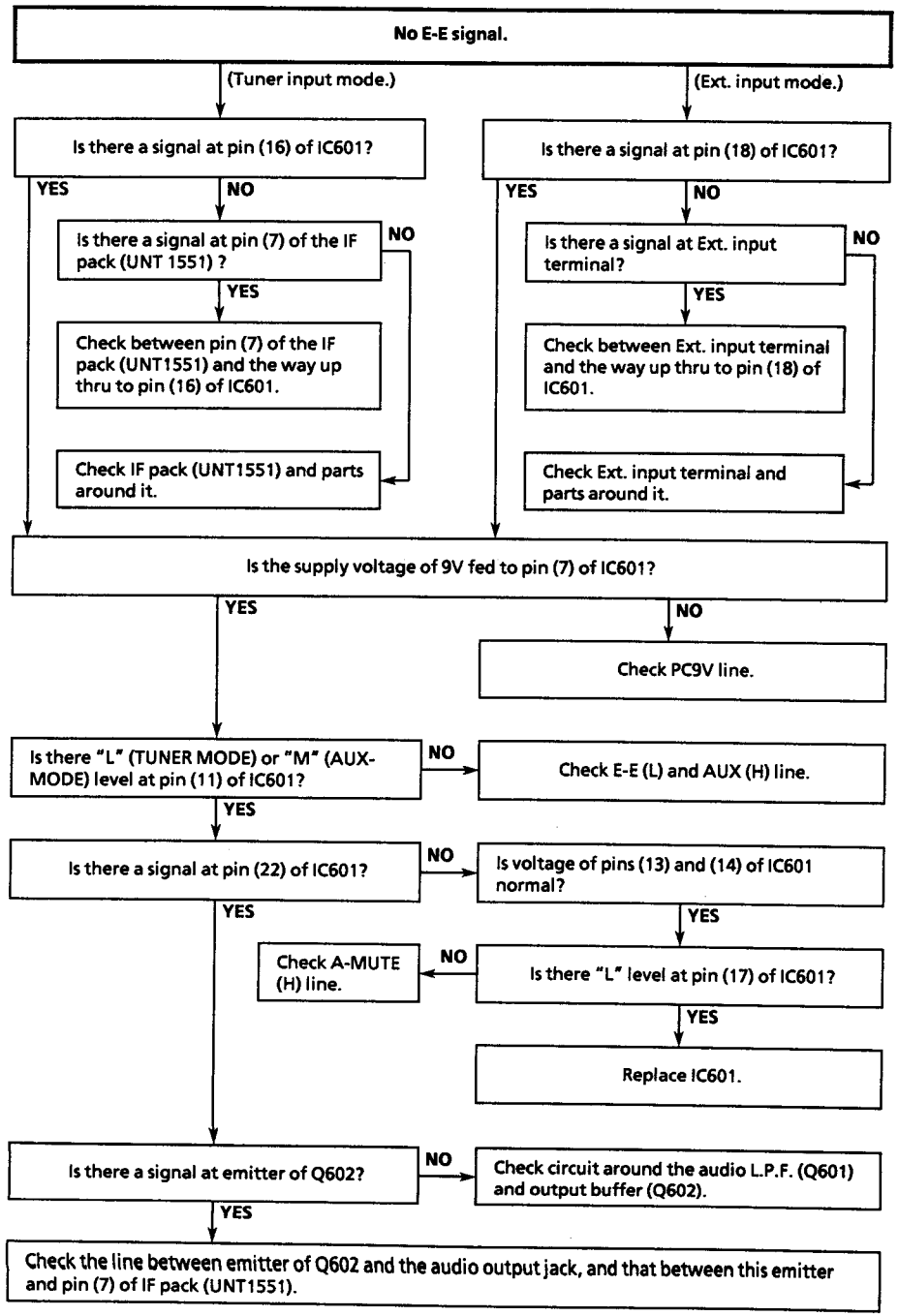

Playback is not possible.
Is there a signal at pin (17) 〔(13)〕of IC301?
NO
Is the supply voltage of 5V fed to pins (16) [(12)] of IC301?
NO
Check PC5V line.
YES
YES
Is there H.SW.P. at pin (20) 〔(16)〕of IC301 ?
NO
Check H.SW.P. line.
YES
Replace IC301.
Is there a signal at pin (51) of IC401?
NO
Check between pin(17) 〔(13)〕of IC301 and all the way up thru to pin (51) of IC401 (Q201~203).
YES
Is there a signal at pins (39) and (38) of IC401?
NO
Check serial data and clock at pins (14) and (15) of IC401.
YES
Is there a signal at pin (27) of IC401?
YES
Check between pin (27) of IC401 and all the way up thru to video output terminal.
NO
Replace IC401.

FLOW CHART NO.22 PLAYBACK MODE (CHROMA) TROUBLESHOOTING

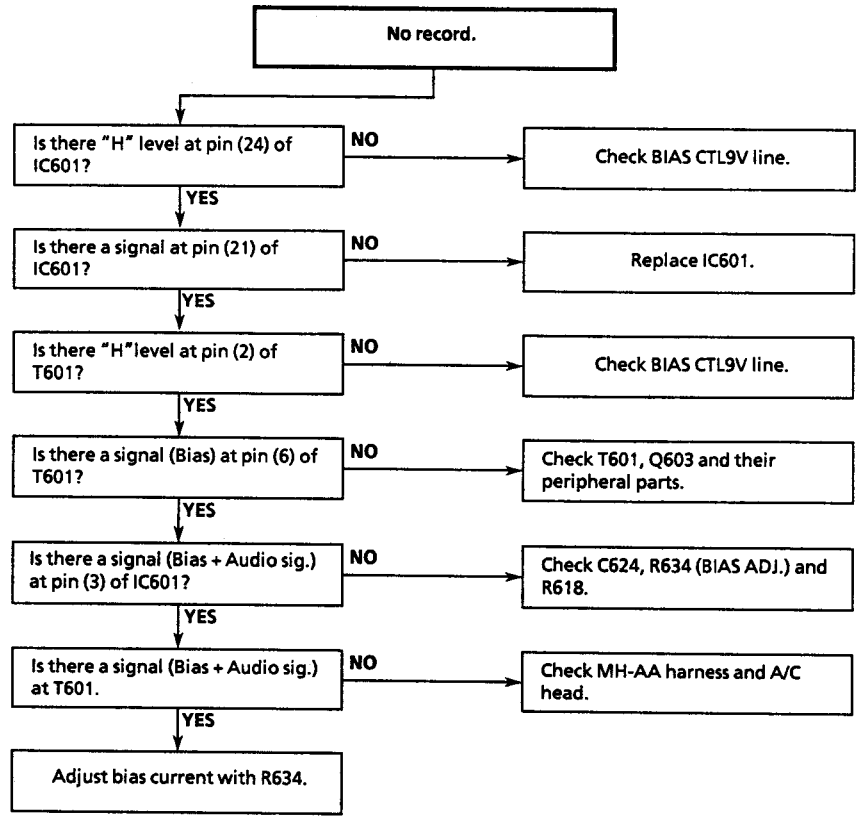

Playback is possible but without colour.
Is there a signal at pin (19) 〔(15)〕IC301?
NO
Replace IC301.
YES
Is there a signal at pin (53) of IC401?
NO
Check between pin (19) 〔(15)〕of IC301 and all the way up thru to pin (53) of IC401.
YES
Is there a signal at pin (19) of IC401?
NO
Check peripheral circuits of X501.
YES
Is there a signal at pin (23) of IC401?
NO
Check between pin (19) of IC401 and the way up thru to pin (23) of IC401.
YES
Is there a chroma signal at pin (27) of IC401?
NO
Replace IC401.

Note: Words shown in the bracket " 〔 〕 " are for the 2 head models only.

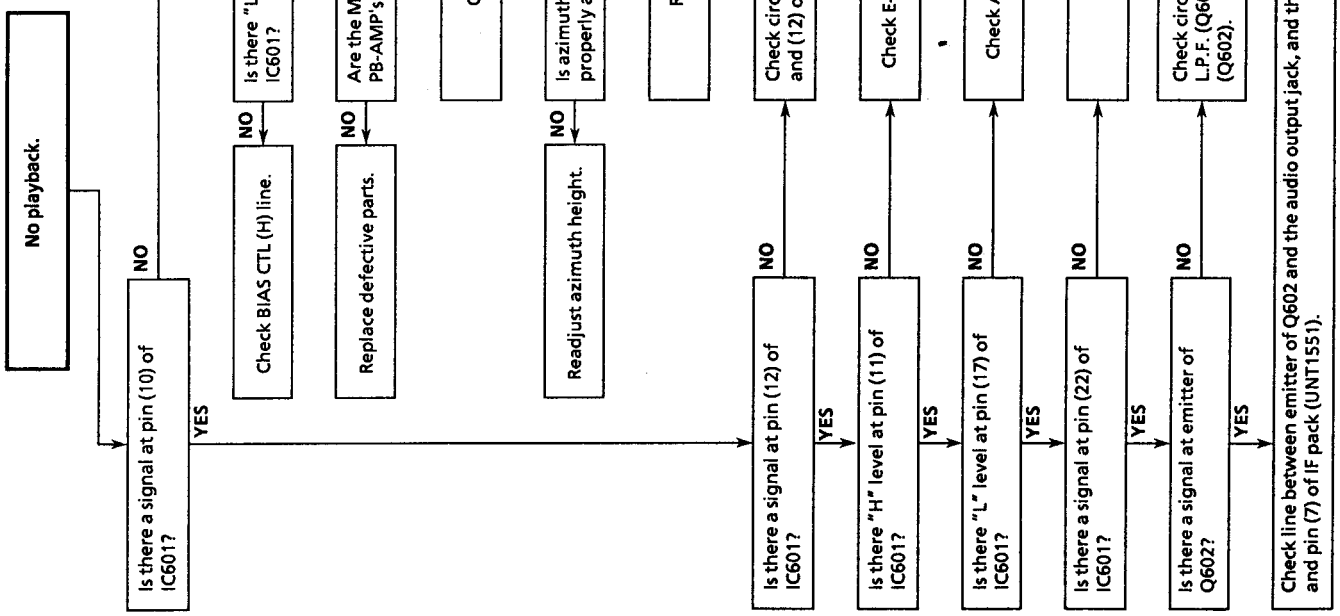
FLOW CHART NO.23 LINEAR SOUND E-E MODE TROUBLESHOOTING


No E-E signal.
(Tuner input mode.)
(Ext. input mode.)
Is there a signal at pin (16) of IC601?
Is there a signal at pin (18) of IC601?
YES
NO
Is there a signal at pin (7) of the IF pack (UNT 1551) ?
Is there a signal at Ext. input terminal?
Check between pin (7) of the IF pack (UNT1551) and the way up thru to pin (16) of IC601.
Check between Ext. input terminal and the way up thru to pin (18) of IC601.
Check IF pack (UNT1551) and parts around it.
Check Ext. input terminal and parts around it.
Is the supply voltage of 9V fed to pin (7) of IC601?
Check PC9V line.
Is there "L" (TUNER MODE) or "M" (AUX-MODE) level at pin (11) of IC601?
Check E-E (L) and AUX (H) line.
Is there a signal at pin (22) of IC601?
Is voltage of pins (13) and (14) of IC601 normal?
Check A-MUTE (H) line.
Is there "L" level at pin (17) of IC601?
Replace IC601.
Is there a signal at emitter of Q602?
Check circuit around the audio L.P.F. (Q601) and output buffer (Q602).
Check the line between emitter of Q602 and the audio output jack, and that between this emitter and pin (7) of IF pack (UNT1551).

FLOW CHART NO.24 LINEAR SOUND RECORDING MODE TROUBLESHOOTING


No record.
Is there "H" level at pin (24) of IC601?
Check BIAS CTL9V line.
Is there a signal at pin (21) of IC601?
Replace IC601.
Is there "H"level at pin (2) of T601?
Check BIAS CTL9V line.
Is there a signal (Bias) at pin (6) of T601?
Check T601, Q603 and their peripheral parts.
Is there a signal (Bias + Audio sig.) at pin (3) of IC601?
Check C624, R634 (BIAS ADJ.) and R618.
Is there a signal (Bias + Audio sig.) at T601.
Check MH-AA harness and A/C head.
Adjust bias current with R634.

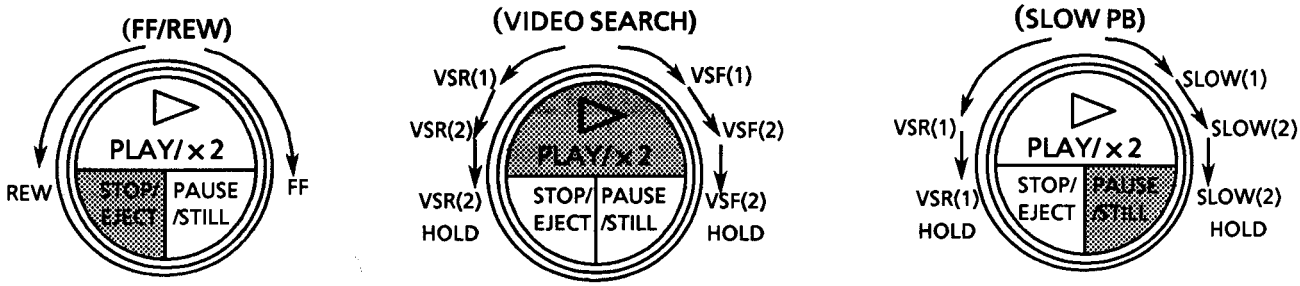
FLOW CHART NO.25 LINEAR SOUND PLAYBACK MODE TROUBLESHOOTING


No playback.
Is there a signal at pin (10) of IC601?
NO
YES
Is there "L" level at pin (24) of IC601?
NO
YES
Check BIAS CTL (H) line.
Are the MH-AA harness and the PB-AMP's peripheral parts normal?
NO
YES
Replace defective parts.
Clean A/C head.
Is azimuth height of the A/C head properly adjusted?
NO
YES
Readjust azimuth height.
Replace A/C head
Is there a signal at pin (12) of IC601?
NO
YES
Check circuits between pins (10) and (12) of IC601.
Is there "H" level at pin (11) of IC601?
NO
YES
Check E-E (L) and AUX (H) line.
Is there "L" level at pin (17) of IC601?
NO
YES
Check AUDIO MUTE (H) line.
Is there a signal at pin (22) of IC601?
NO
YES
Replace IC601.
Is there a signal at emitter of Q602?
NO
YES
Check circuit around the audio L.P.F. (Q601) and output buffer (Q602).
Check line between emitter of Q602 and the audio output jack, and that between this emitter and pin (7) of IF pack (UNT1551).

DESCRIPTION OF SHUTTLE FUNCTION

1. Description of operation.

The shuttle system is designed to control the basic modes of the VCR with the use of shuttle ring.



Fast Forward and Rewind

(Unit)

Stop the PB mode. Turn the ring clockwise or counterclockwise and release it (the shuttle ring returns to the center point), and the unit will be in the FF or REW mode.

(Remote controller)

Stop the PB mode and press the FF or REW button.

Video Search

(Unit)

During playback, turn the ring clockwise or counterclockwise and hold it, and the unit will be in the VSF or VSR mode. The search speed is variable in two steps depending on the turning angle. Release the ring (the shuttle ring returns to the center point) and the unit will be back in the PB mode.

(Remote controller)

During playback, press the FF or REW button, and the unit will be in the VSF orVSR mode. Each time the button is pressed, the search speed changes in the order of (2) → (1) → (2).

Tape Speed

	VSF/VSR (1)	VSF/VSR (2)	SLOW (1)	SLOW (2)
PAL SP/LP	×3	×7	1/30	1/10
NTSC SP/LP	×3	×5	1/30	1/10
NTSC EP	×5	×15	1/30	1/10

Variable Slow Motion

(Unit)

During pause, turn the ring clockwise and hold it to go to the SLOW PB mode. The slow play speed is variable in two steps depending on the turning angle. Release the ring (the shuttle ring returns to the center point), and the unit will be back in the PAUSE mode. When the ring is turned all the way clockwise, the SLOW PB mode is held.

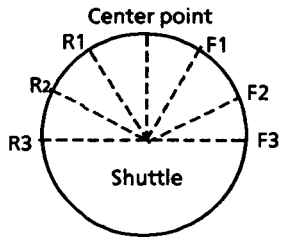
For returning to the usual play or pause, press the PB button or the PAUSE button.

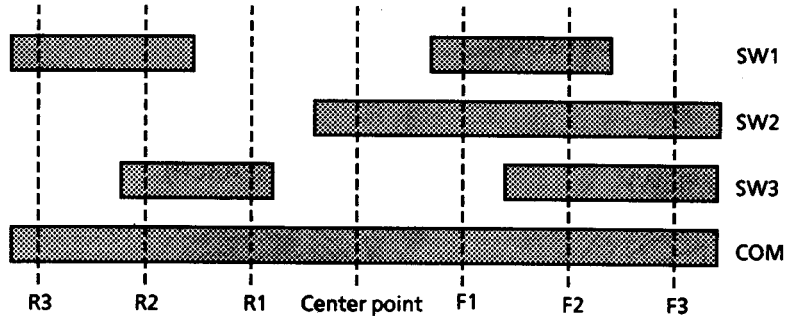
During pause, turn the ring counterclockwise and hold it to go to the VSR mode. Release the ring, and the unit will be back in the PAUSE mode. When the ring is turned all the way counterclockwise, the VSR mode is held.

(Remote controller)

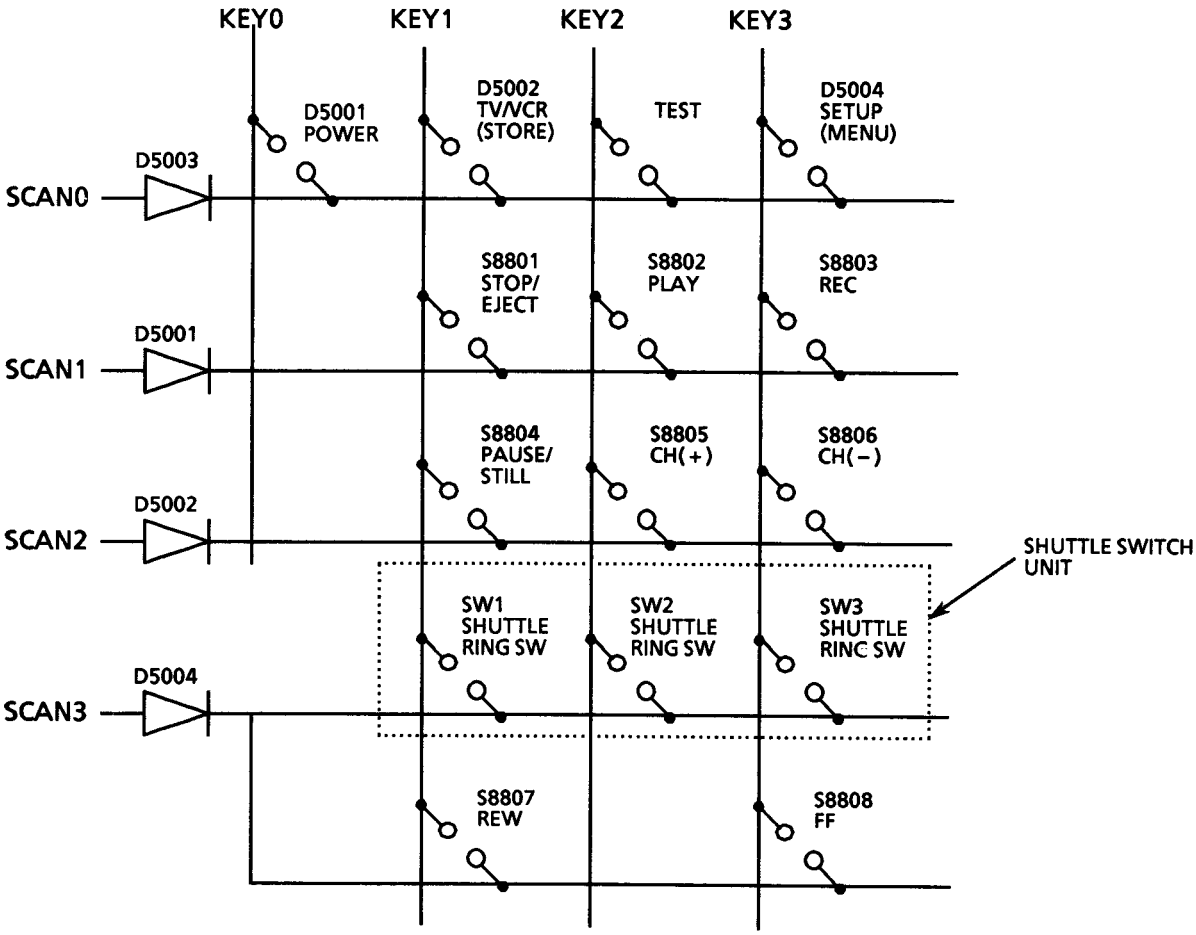
During play, pause, fast play or video search , press the SLOW button and the unit will in the SLOW PB mode. The slow play speed can be changed between 1/30 and 1/10 using the SLOW buttons (+) and (−). If noises appear on the TV screen, make adjustment using the TRACK buttons (+) and (−). Press the PLAY/ x 2 button to resume the usual play.

2. Shuttle ring key matrix outline





	R3	R2	R1	Center point	F1	F2	F3
SW1	1	1	0	0	1	1	0
SW2	0	0	0	1	1	1	1
SW3	0	1	0	0	0	1	1



3. Shuttle control specifications

1) The FF and REW modes are continued with the ring at the center position.
2) The search and slow play speeds are as follows.

	VSF (1)/VSR (1)	VSF (2)/VSR (2)	SLOW (1)	SLOW (2)
PAL SP/LP	×3	×7	1/30	1/10
NTSC SP/LP	×3	×5	1/30	1/10
NTSC EP	×5	×15	1/30	1/10

※ The shuttle ring dose not click at the clockwise and counterclockwise ends. Being released at any point it returns to the center point.

3) Stop mode

Initial position	Set position						
	R3	R2	R1	Center point	F1	F2	F3
F3 (FF)	REW	REW	REW	FF Continued	FF	FF	—
F2 (FF)	REW	REW	REW	FF Continued	FF	—	FF
F1 (FF)	REW	REW	REW	FF Continued	—	FF	FF
Center point (STOP)	REW	REW	REW	—	FF	FF	FF
R1 (REW)	REW	REW	—	REW Continued	FF	FF	FF
R2 (REW)	REW	—	REW	REW Continued	FF	FF	FF
R3 (REW)	—	REW	REW	REW Continued	FF	FF	FF

4) Play Mode

Initial position	Set position						
	R3	R2	R1	Center point	F1	F2	F3
F3 (VSF2)	VSR2	VSR2	VSR1	VSF2 Continued	VSF2 Continued	VSF2 Continued	—
F2 (VSF2)	VSR2	VSR2	VSR1	PLAY Continued	VSF1	—	VSF2
F1 (VSF1)	VSR2	VSR2	VSR1	PLAY Continued	—	VSF2	VSF2
Center point (PLAY)	VSR2	VSR2	VSR1	—	VSF1	VSF2	VSF2
R1 (VSR1)	VSR2	VSR2	—	PLAY Continued	VSF1	VSF2	VSF2
R2 (VSR2)	VSR2	—	VSR1	PLAY Continued	VSF1	VSF2	VSF2
R3 (VSR2)	—	VSR2 Continued	VSR2 Continued	VSR2 Continued	VSF1	VSF2	VSF2

5) Still mode

Initial position	Set position						
	R3	R2	R1	Center point	F1	F2	F3
F3 (SLOW2)	VSR1	VSR1	VSR1	SLOW2 Continued	SLOW2 Continued	SLOW2 Continued	—
F2 (SLOW2)	VSR1	VSR1	VSR1	STILL Continued	SLOW1	—	SLOW2
F1 (SLOW1)	VSR1	VSR1	VSR1	STILL Continued	—	SLOW2	SLOW2
Center point (STILL)	VSR1	VSR1	VSR1	—	SLOW1	SLOW2	SLOW2
R1 (VSR1)	VSR1	VSR1	—	STILL Continued	SLOW1	SLOW2	SLOW2
R2 (VSR2)	VSR1	—	VSR1	STILL Continued	SLOW1	SLOW2	SLOW2
R3 (VSR2)	—	VSR1 Continued	VSR1 Continued	VSR1 Continued	SLOW1	SLOW2	SLOW2

※ When the ring is released from the F1 or F2 point, the unit back in the initial mode (PLAY or STILL) mode. When it is turned up to the F3 point and then released back to the center point, the unit continues the previous mode (F3 mode).
The FF and REW modes are continued when the ring has come from the F1, F2 or F3 point to the center point.

REPLACEMENT OF IC804 (E^2PROM)

≪Servicing precautions≫

When the IC804 (E^2PROM) has been replaced, make the following reprogramming.
Depending on models, the IC804 (E^2PROM) has been factory adjusted for it's memory function.
It's therefore necessary to reprogram the memory function for the model in question.
Note that the servo circuit requires readjustments for the slow and still modes.

Memory function reprogramming.

1. Check the power off. (Power is standby mode)
2. Make for a moment short circuited jumper pins 33 and 34 on the main PWB.
   Be sure that all the fluorescent display tubes light up into the TEST mode.
3. Using the CHANNEL (+) and (−) buttons, select the right function numbers from among JP0-JP31, which appear in the fluorescent display tube, referring to the E^2PROM map.
   Press the DISPLAY button to pick up the functions (ON) and the CLEAR button to discard the functions (OFF).
   * When the DISPLAY button has been pressed (ON), the memory function No. starts flashing.
   * When the CLEAR button has been pressed (OFF), the memory function No. lights up.
4. Make the short circuited cathode of D5001 and jumper pin 391 on the main PWB, and the settings will be displayed in hexadecimal notation.
   Now you can see if the settings are correct.

   Example: "ON" and "OFF" are taken as "1" and "0" respectively. The numbers JP0 to JP31 are divided into eight groups and each group's setting is displayed in hexadecimal notation.

J31	J30	J29	J28	J27	J26	J25	J24	J23	J22	J21	J20	J19	J18	J17	J16
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇩				⇩				⇩				⇩		
	SPACE				0				0				0		

J15	J14	J13	J12	J11	J10	J9	J8	J7	J6	J5	J4	J3	J2	J1	J0
0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	1
	⇩				⇩				⇩				⇩		
	0				4				0				D		

   "000040D" appears in the fluorescent display tube.

5. Finally make for moment short circuited jumper pins 33 and 34 on the main PWB to clear the TEST mode or press the operate button to turn the power on.

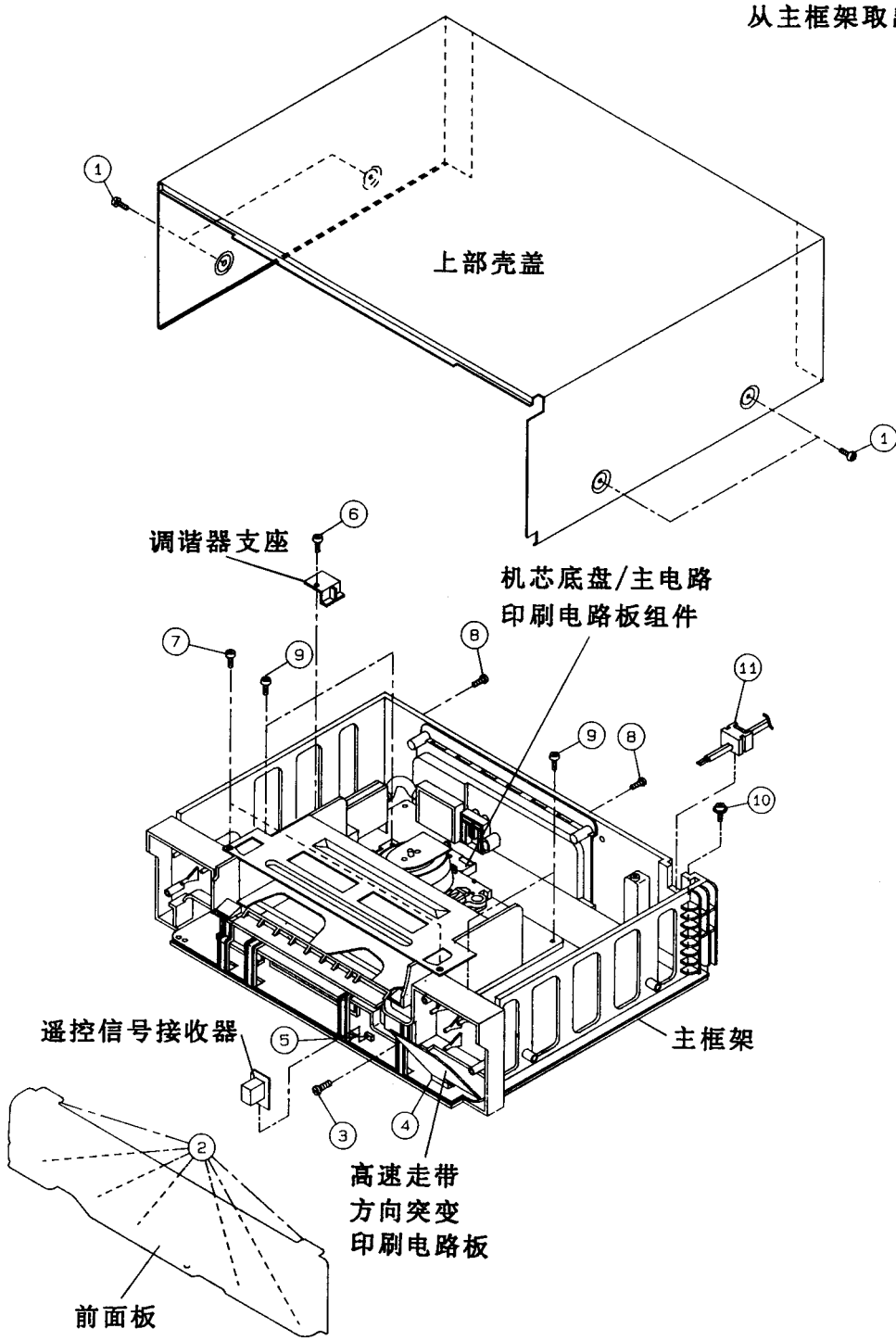
		MY2/B	MA30B VR135 MA30SA MA20B	MA30D	A36X	A36NZ	MA40B	MA48D	A62X	A41X	A42NZ	A50X	A72X	A72NZ		
JP31	---	0	0	0	0	0	0	0	0	0	0	0	0	0		
30	---	0	0	0	0	0	0	0	0	0	0	0	0	0		
29	---	0	0	0	0	0	0	0	0	0	0	0	0	0		
28	---	0	0	0	0	0	0	0	0	0	0	0	0	0		
27	NT-PB	0	1	1	0	0	1	1	0	1	0	0	0	0		
26	---	0	0	0	0	0	0	0	0	0	0	0	0	0		
25	HEAD1	0	0	0	0	0	1	1	1	0	0	0	1	1		
24	HEAD0	1	0	0	0	0	0	0	0	0	0	1	0	0		
23	---	0	0	0	0	0	0	0	0	0	0	0	0	0		
22	---	0	0	0	0	0	0	0	0	0	0	0	0	0		
21	---	0	0	0	0	0	0	0	0	0	0	0	0	0		
20	---	0	0	0	0	0	0	0	0	0	0	0	0	0		
19	Hi-Fi	0	0	0	0	0	0	0	0	0	0	0	0	0		
18	NICAM	0	0	0	0	0	0	0	0	0	0	0	0	0		
17	G-CODE1	1	0	0	0	0	0	0	0	0	0	0	0	0		
16	G-CODE0	1	0	0	0	0	0	0	0	0	1	0	1	1		
15	OEM	1	1	1	0	0	1	1	0	0	0	0	0	0		
14	LP	1	0	0	0	0	1	1	1	0	0	1	1	1		
13	---	0	0	0	0	0	0	0	0	0	0	0	0	0		
12	SHUTTLE	0	0	0	0	0	1	1	1	0	0	0	1	1		
11	LINE2	0	0	0	0	0	0	0	0	0	0	0	1	1		
10	CATV	0	0	0	0	0	0	0	0	0	0	0	0	0		
9	TUNER1	1	0	0	0	0	0	0	0	0	0	0	0	0		
8	TUNER0	1	0	0	0	0	0	0	0	0	0	0	1	0		
7	DECODER	1	0	0	0	0	0	0	0	0	0	0	0	0		
6	SYSTEM-I	0	0	1	0	0	0	1	0	0	0	0	0	0		
5	VCR1	1	0	0	0	0	0	0	0	0	0	0	0	0		
4	VCR0	0	0	0	0	1	0	0	0	0	1	0	0	1		
3	PDC	0	0	0	0	0	0	0	0	0	0	0	0	0		
2	VPS	0	0	0	0	0	0	0	0	0	0	0	0	0		
1	COLOUR1	0	1	1	0	0	1	1	0	0	0	0	0	0		
0	COLOUR0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		103C3A0	8008002	8008042	0000000	0000010	A00D002	A00D042	2005000	8000000	0010010	1004000	2015900	2015810		

(Note: "1" : flashing "0" : lights up)

2. 分解和组装

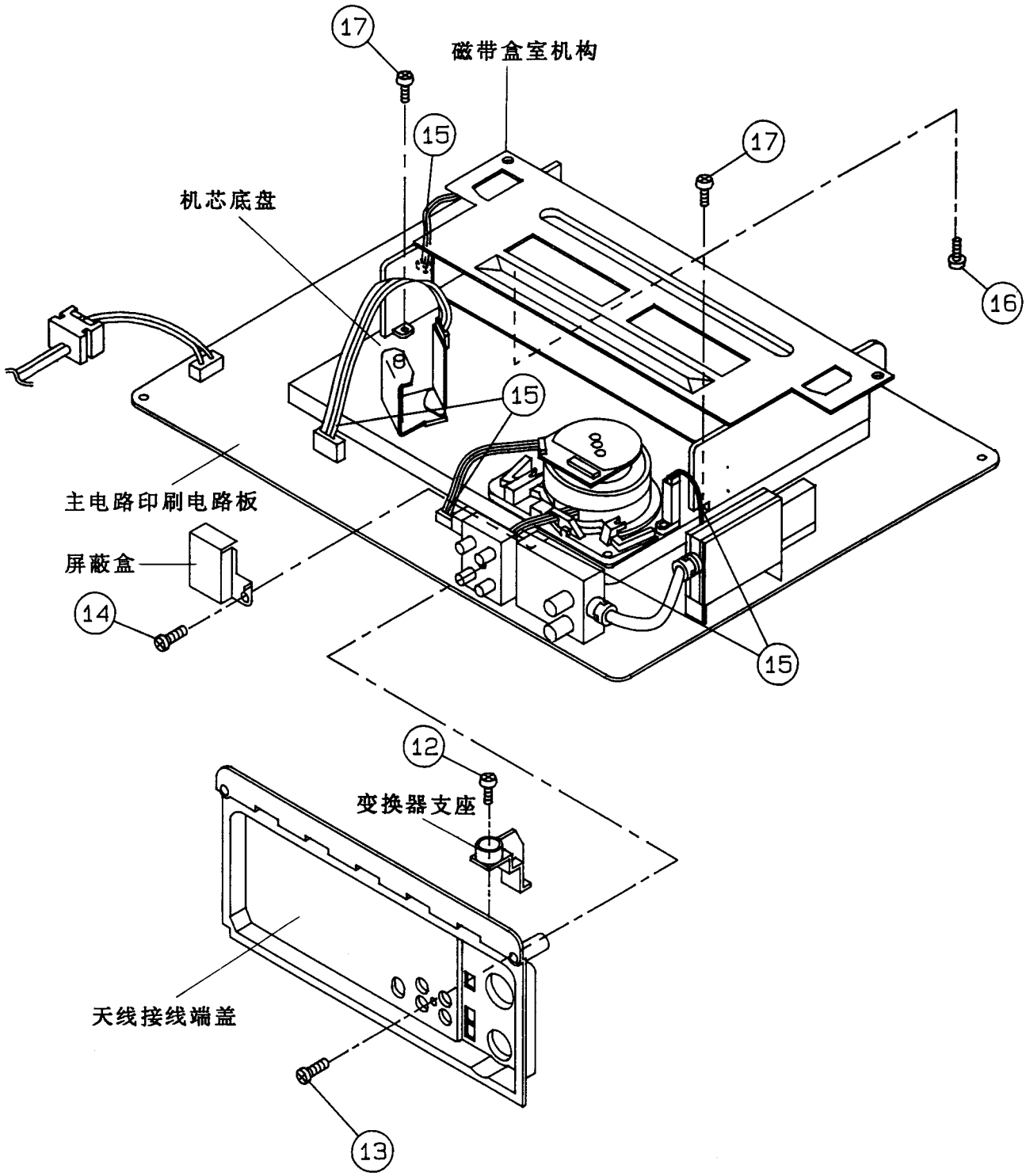
2-1 主要部件的分解

上部壳盖　　：松去两支紧固螺丝(1)。
前面板　　：松去七支销卡(2)。
高速走带方向突变印刷电路板　　：松去一支紧固螺丝(3)。使印刷电路板倾斜45度，从插座(4)取出之。
遥控信号接收器　　：从插座(5)取出之。
调谐器支座　　：松去一支紧固螺丝(6)
机芯底盘/主电路印刷电路板组件　　：松去两支紧固螺丝(7)、两支紧固螺丝(8)、四支紧固螺丝(9)、一支紧固螺丝(10)以及一支垫圈(11)，将机芯底盘/主电路印刷电路板组件的后端提起，从主框架取出之。



2-2 机芯底盘/主电路印刷电路板组件的分解

变换器支座　　：松去一支紧固螺丝(12)。
天线接线端盖　：松去一支紧固螺丝(13)。
机芯底盘/磁带盒式机构组件　：松去一支紧固螺丝(14)，取出屏蔽盒。
取出三条全平电缆与两条导线(15)。
注意避免弄错全平电缆的上下方向。
松去一支紧固螺丝(16)。
向正上方取出主电路印刷电路板上的机芯底盘。取出时，注意避免损伤周围的部件。
磁带盒室机构　：松去两支紧固螺丝(17)。



2-3盒室控制机构组装的注意事项

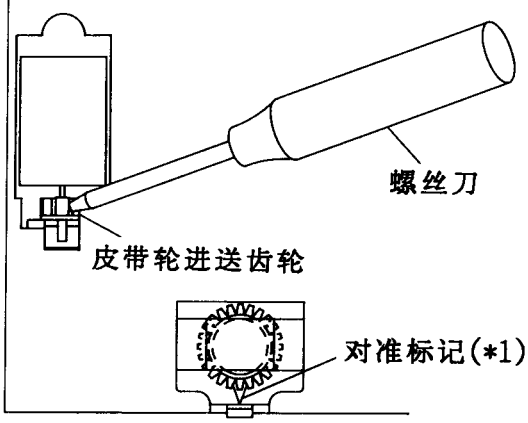
盒室控制机构的组装

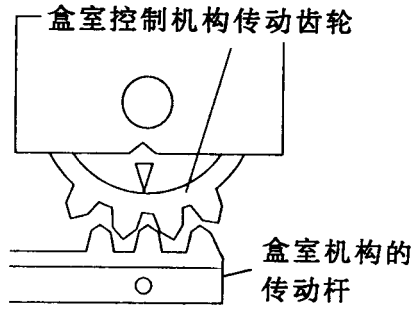
安置盒室控制器电路于盒室机构之前，先对其自身进行初期设定。初期设定的进行分电路设定和机械设定。

电路设定：

用22Ω电阻短接主印刷电路板左侧的TP5001（或跨接销241）和TP5002（或跨接销242）之间，让盒室机构退回至其初始位置(*1)。确认其动作到位后，再安置盒室控制器电路于其机构之上。

（此方法用于盒室机构已设定好其印刷电路板之场合。）





配相点

机械设定：

用螺丝刀拨转磁带装挂马达皮带轮进送齿轮，让盒室机构退回至其初始位置(*1)。确认其动作到位后，再安置盒室控制器电路于其机构之上。（此方法用于盒室机构未设装印刷电路板之场合。）

盒室机构与印刷电路板的连接

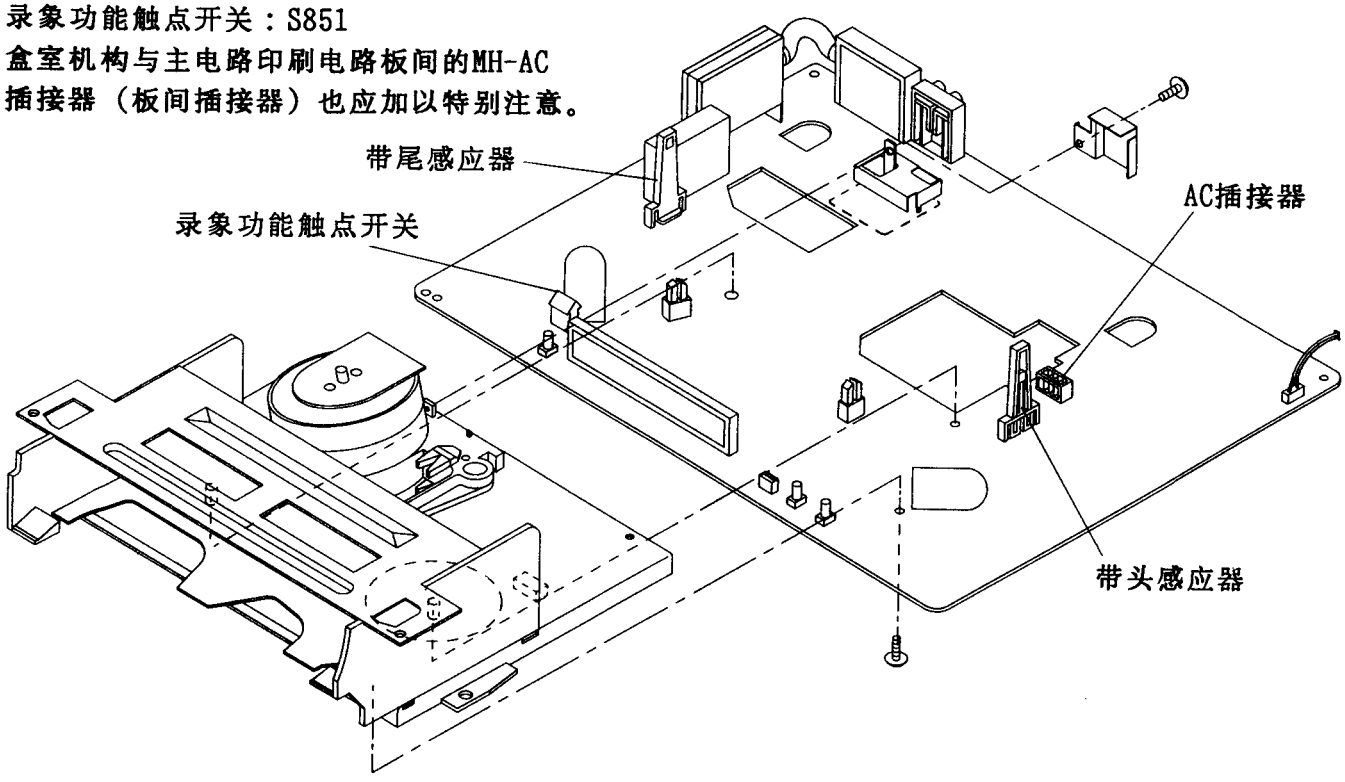
将盒室机构上的两个凸块对准主电路印刷电路板上的两个定位参考记号（圆形为正参考，椭圆形为副参考）。然后垂直放下盒室机构，注意切勿让其机构的边缘部碰伤附近的其他元件。旋紧固定盒室机构和主电路印刷电路的两支螺丝（一支用于固定盒室机构和前置放大器屏蔽，另一支位于主电路印刷电路板焊线侧的磁带装挂马达近旁）。插接盒室机构和主电路印刷电路板间的扁平型电缆插接器（AA、AD和AH)以及导线插接器（AE和AL）。

应特加注意的元件：

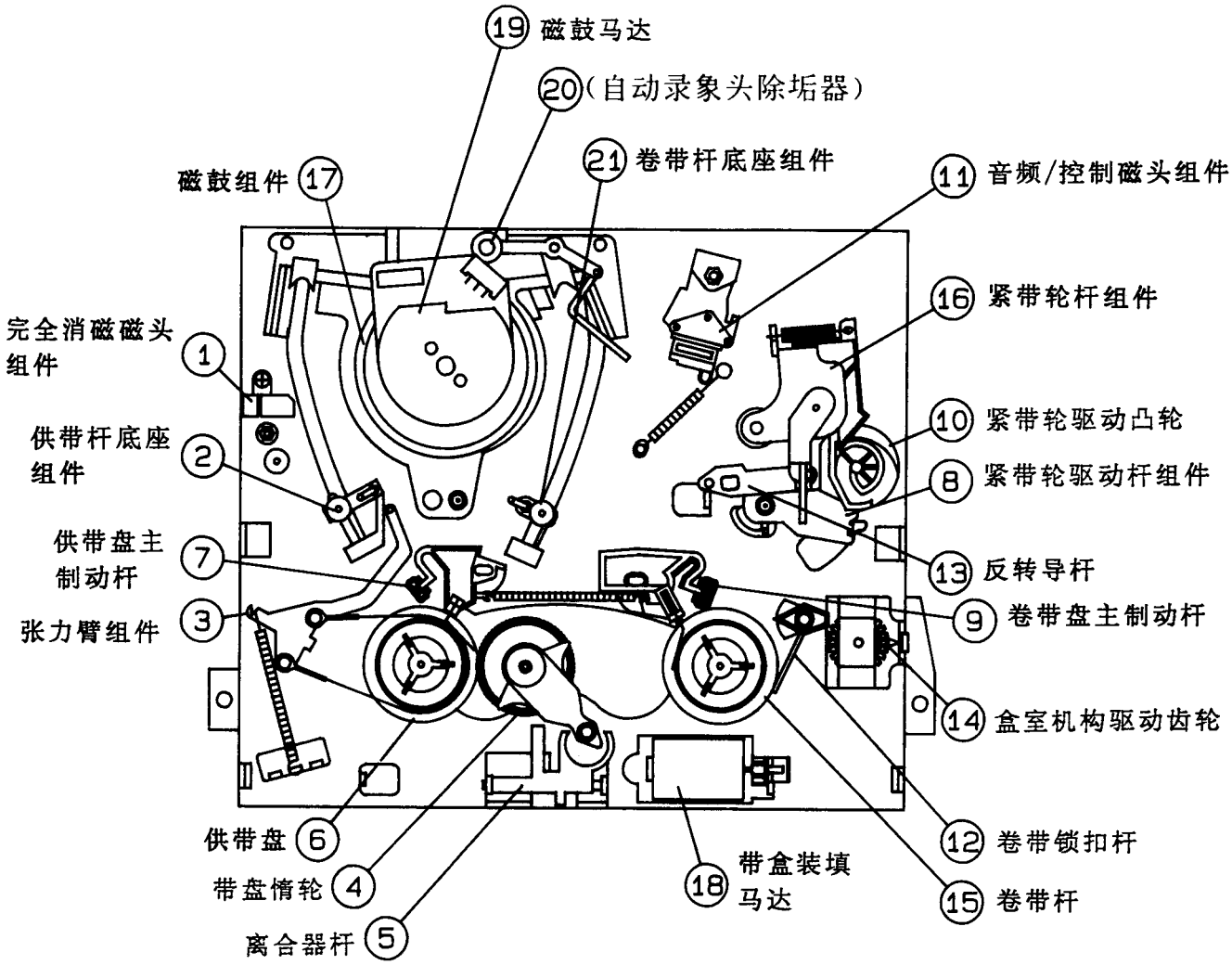
带头感应器、带尾感应器：Q851、Q852

录象功能触点开关：S851

盒室机构与主电路印刷电路板间的MH-AC插接器（板间插接器）也应加以特别注意。

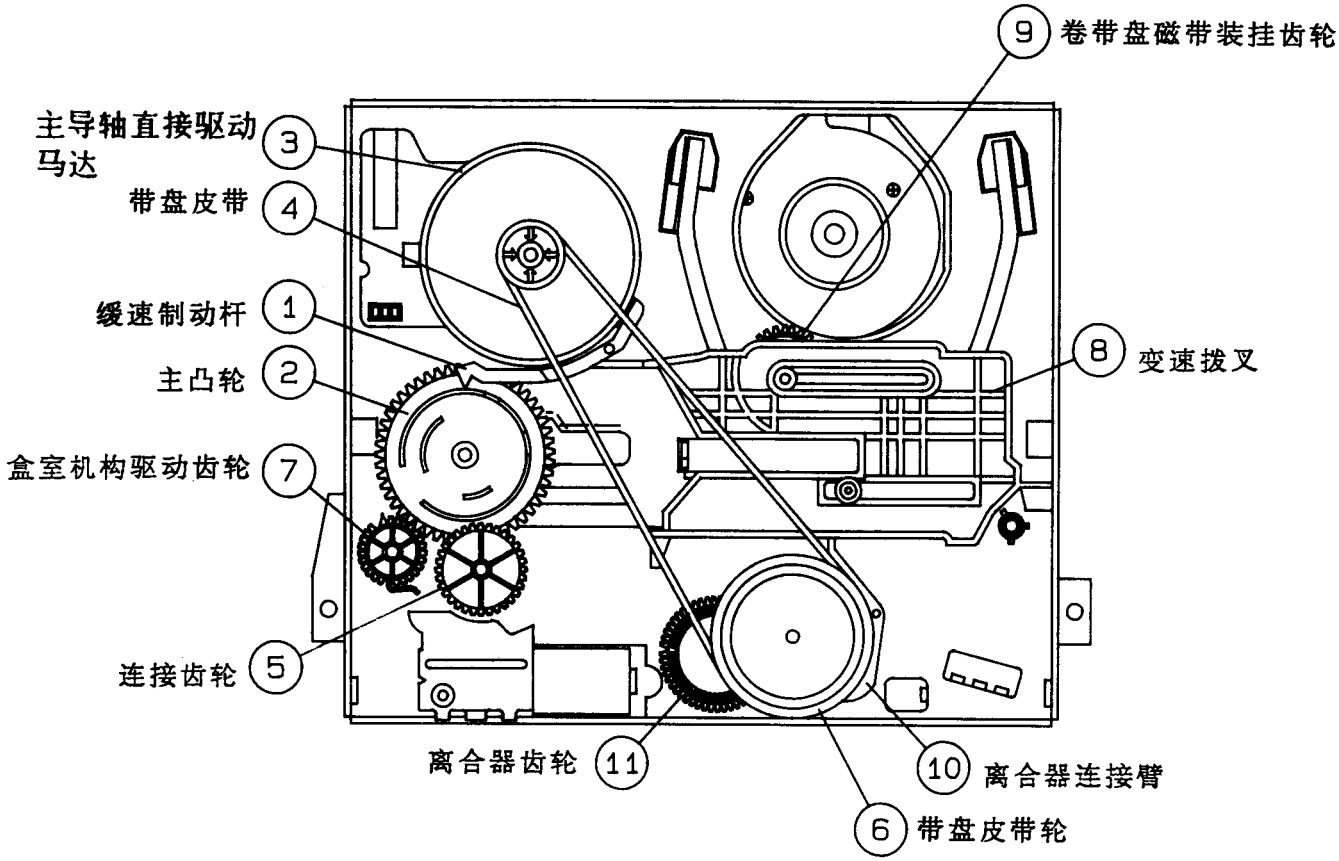


3. 主要机械部件的配置（俯视）及其功能



序号	功　　能	序号	功　　能
1.	完全消磁磁头组件 于录象工作状态时消去录象磁带的全部记录内容。	13.	反转导杆 于视频搜索倒带状态时，拉挂磁带，并且通过其高导杆和低导杆控制其走带高度。
3.	张力臂组件 检测走带时录象磁带的松紧程度，并与张力带一道对供带盘产生制动作用。	16.	紧带轮杆组件 于走带状态中，压装磁带于主导轴。于磁带出盒动作时，其右侧突出部拨动磁带盒室控制组件离合器，使其机构将带盒推出盒室。
7.	供带盘主制动 于录象机动作停止时以及录象机处快进或倒带状态时，对供带盘产生制动作用，以防止磁带的松弛。		
9.	卷带盘主制动 于录象机动作停止时以及录象机处快进或倒带状态时，对卷带盘产生制动作用，以防止磁带的松弛。	18.	带盒装填马达 其马达之作用在于为填装机构提供带盒填入及磁带装挂的动力。其动力通过马达皮带的传动，转为主凸轮及磁带盒室控制机构的动作。

主要机械部件的配置（仰视）及其功能



序号	功　　能	序号	功　　能
1.	缓速制动器 于缓速静止状态时，其制动器相触于与主凸轮连动的主导轴，对其轴产生适当的制动作用。	6.	带盘皮带轮 将主导轴直接驱动马达的动力经带盘悄轮传送给带盘。
3.	主导轴直接驱动马达 提供走带所需动力。其动力的转换由带盘皮带实现。	8.	变速拨叉 将主凸轮的运动传输至制动器齿轮与带盒装填齿轮。
4.	带盘皮带 带动带盘皮带轮转动，以驱动磁带的运转。	9.	卷带盘磁带装挂齿轮 通过磁带装挂继动齿轮，移动卷带杆底座及导辊，并将磁带环绕于磁鼓。另外，其齿轮还有传动力于供带盘磁带装挂齿轮之作用。

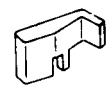
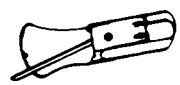
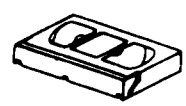
4 机械部件的调整、更换及装配

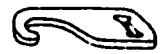
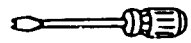
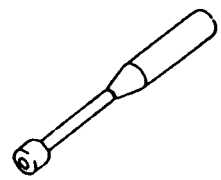
这里我们将为您介绍一些较简单的保养调试方法。这些方法与需要特殊的仪器和工具的复杂检修(例如,磁鼓的组装或更换等）相比更为容易简单。

我们相信，下表所列便于使用的工具在您为本录象机作定期保养以维持其原有的工作状态中无疑能起很大的作用。

机械部件调整必需的工具

检查修理时，应准备下列工具才能顺利进行修理工作。

序号	工 具 名 称	零件编号	编码	形 状	备 注
1	带盘高度调整工具	JiGRH0002	BR		用于检查、调整带盘高度。
2	主平面调整工具	JiGMP0001	BY		
3	音频/控制磁头倾斜调整工具	JiGACH-A323U	BX		用于设定音频／控制磁头的倾斜角度。
4	转矩测量计(90克)	JiGTG0090	CM		用于检查、调整供带轮和卷带轮的转动力矩。
	转矩测量计(1.2公斤)	JiGTG1200	CN		
5	转矩测量计测头	JiGTH0006	AW		
6	盒匣磁带式转矩测量计	JiGVHT-063	CZ		用于检查、调整卷带轮的转动力矩以及测量磁带反向张力。
7	张力测量计(300克)	JiGSG0300	BF		分为300克和2.0公斤两量级，用于张力测量。
	张力测量计(2.0公斤)	JiGSG2000	BS		
8	六角扳手(0.9毫米)	JiGHW0009	AE		用于松弛或紧固特制六角螺栓。
	六角扳手(1.2毫米)	JiGHW0012	AE		
	六角扳手(1.5毫米)	JiGHW0015	AE		
9	校正用磁带 (PAL制式)	VR0CPSV	CK		专用于机器的电路微调。

序号	工 具 名 称	零件编号	编号	形 状	备 注
11	张力测量计接续器	JiGADP003	BK		用于张力测量计。
12	专用螺丝刀	JiGDRiVERH-4	AP		用于导辊高度调整。
13	张力带及张力板调整工具	JiGDRiVER-6	BM		用于张力带和张力板的调整。
14	扭转改锥（5 公斤）	JiGTD1200	CB		用于扭转树脂制工具。标准扭转值为 5 公斤。
15	套管改锥	JiGDRiVER110-7	AS		用于音频/控制磁头高度和X位置的调整。
		JiGDRiVER110-4	AV		用于定位导杆的高度调整。
17	反转导杆高度调整工具	JiGRVGH-F18	BU		用于反转导杆的高度调整。

机械部件的定期保养期间

为保持机械部件的正常工作性能，务必按下表定期进行维护保养。

保养间隔 / 部件名称	每500小时	每1000小时	每1500小时	每2000小时	可能出现症状	备注
导辊组件	□	□	□	○	水平噪音线出现，磁头不时被磁带缠绞。	如发生不正常的旋转或显著的摇摆，就需更换该部件。
供带阻抗滚子	□	□	□	○		
供带阻抗滚子(内侧)		□		□		用指定清洁剂擦拭与磁带接触部份。
供带阻抗滚法兰	□	□	□	□		
定位导杆	□	□	□	□		
斜杆	□	□	□	○		
视频磁头（上部磁鼓组件）	□	○□	□	○□	信号/噪声比过小，无彩色表现。	用指定清洁剂擦拭与磁带接触部份。
完全消磁磁头	□	□	□	○	色彩过淡，图象闪跳。	
音频/控制磁头	□	□	□	○	声音太小或者噪音太大。	
下部磁鼓组件	□	□	□	○	装入校正用磁带时，包络线非平坦。	
主导轴直接驱动马达	□	□	□	○	磁带不转，色彩不均。	
紧带轮	□	□	□	○	不走带，磁带松弛。	用指定清洁剂擦拭橡胶与橡胶接触部份。
带盘皮带		□		○	不走带，磁带松弛，快进或倒带时走带不正常。	
张力带组件				○	带盒不填入或不退出。	
装填马达				○		
带盘惰轮组件				○	不走带。	
带盘皮带轮组件		□△		□○		
离合器齿轮组件				○		
供带/卷带主制动杆				○	磁带松弛。	
AHC（自动录象头除垢器）		○		○		除垢器滚轮部位的磨耗过大时，就需更换该部件。更换时，只要更换录象头除垢器臂组件即可。

注意：○：部件更换

□：部件清洗(用不起毛的绸布蘸异丙醇擦拭)

△：部件注油(注有标记之部件应该每1000小时用高级轴油点注润滑)

如发现所测数值超过或不及规定范围，务必对该部件进行清洗或加以更换。

磁带盒室控制机构的拆卸及安装

●盒室控制机构的拆卸

1.退出磁带盒匣，设机构于出盒状态。

2.从电源插座中拔出电源引线插头。

3.按下述步骤的要求顺序进行拆卸。

a)松去紧固磁带盒室控制机构的紧固螺丝(1)和(2)。

b)按箭头方向移动磁带盒室机构，然后将其向上拉出。

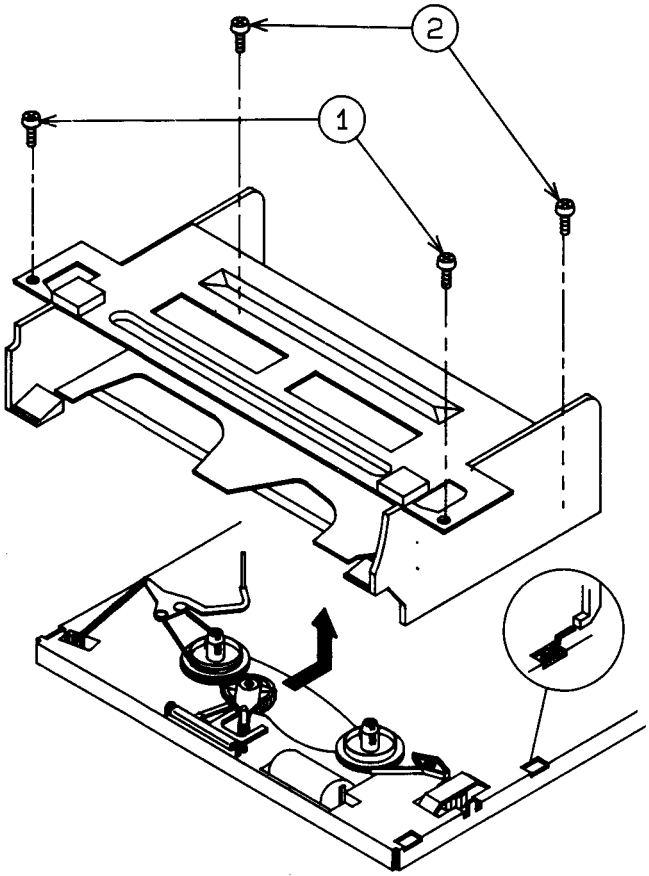


图4-1

●盒室控制机构的组装

1.安装盒室机构前，先用22Ω电阻短接主印刷电路板左侧的TP5001（或跨接销241）和TP5002（或跨接销242）之间。然后，插入电源引线插头，盒室控制机构驱动齿轮开始转动。机芯底盘窗口处正好出现标记时转动停止。按图4-2所示，通过盒室控制机构驱动齿轮的转角对底盘窗口处出现的标记位置进行调整。

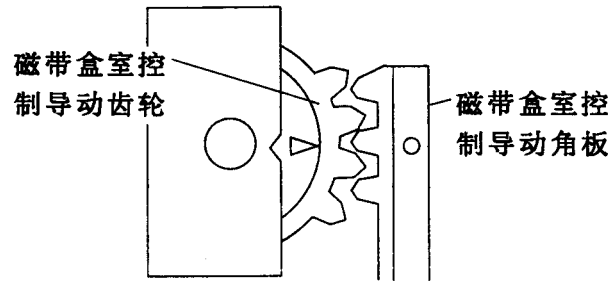


图4-2

2.按拆卸步骤的相反顺序进行组装。

注意：

①拆卸或组装时，如使用带磁螺丝刀，务请注意不要让其触碰音频/控制(A/C)磁头、完全消磁(FE)磁头以及磁鼓。

②拆卸或组装磁带盒室控制机构时，务请谨慎小心，切勿磕碰其机构，同时注意不要让工具等碰撞导向销、磁鼓等精密度较高的部件。

③组装之后，填装一录象带盒于盒室控制机构中。

无盒室控制机构的走带测试

1.电源接通之前，先用22Ω电阻短接主印刷电路板左侧的TP5001(或跨接销241)和TP5002(或跨接销242）之间。

2.插电源引线插头于电源插座。

3.开启电源开关。

4.用手打开磁带盒匣端口之盖。

5.用胶带张贴之以保持其开盖状态。

6.置其于主机芯中的走带机构。

7.应将500g的重物牢固地安置于录象带盒上。

8.作磁带的走带测试。

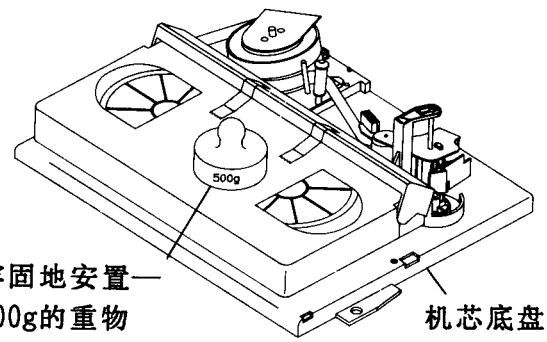


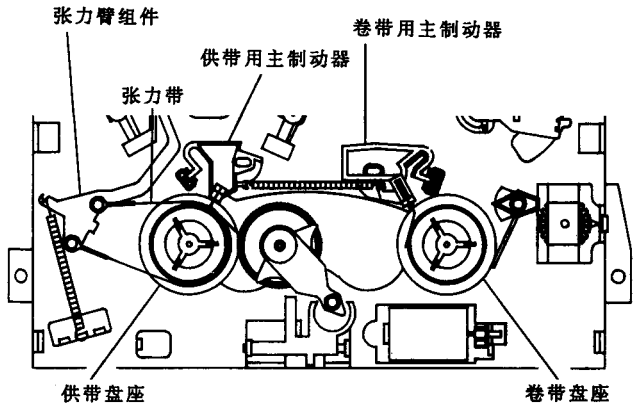
图4-3

注：压其重物不得超过500克。

带盘座的拆装与高度

●带盘座的拆卸

1.拆去磁带盒室控制机构。
2.从张力臂上取出张力带。
3.拆去供带用主制动器和卷带用主制动器。
4.拆去供带盘座和卷带盘座。



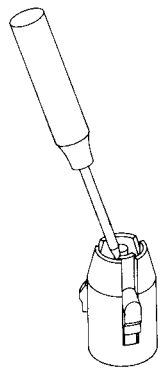


图4-4

注意：

拆卸时，应按图中箭头所示方面按压张力带，以免使锁扣变形。

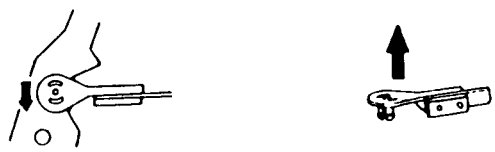


图4-5

●供带盘座的更换

1.清擦供带盘座轴，并注油加以润滑。
2.将准备好的新供带盘座插套入其轴。
3.环张力带于供带盘座装置安置就位，并将其端插入张力臂之插孔。
4.检查供带盘座的高度后，安置供带用主制动器就位。

注意：

①安置供带盘座时，务请格外小心，切勿弯折扭曲张力带。
②切勿碰伤供带用主制动器。

●卷带盘座的更换

1.清擦卷带盘座轴，并注油加以润滑。
2.将准备好的新卷带盘座插套入其轴。
3.检查卷带盘座的高度后，安置卷带用主制动器就位。

注意：

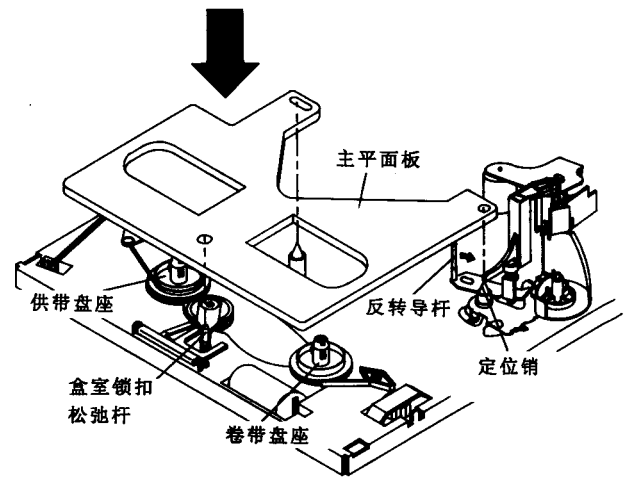
务请小心谨慎，切勿碰伤卷带用主制动器。

＊带盘座更换之后，须检查调试视频搜索倒带时的反向张力（见第80页），以及其制动力矩（见第83页）。

●带盘高度的检测和调整

注意：

将主平面板设置于主机芯，注意切勿磕碰磁鼓（见图4-6所示）。



用手指松开反转导杆，
使主平面板设置。

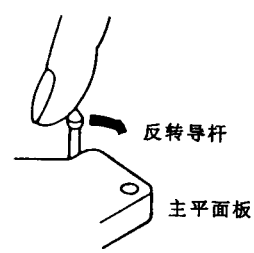


图4-6

●检查带盘座是否低于图示A位置而高于B位置。如果所测高度不在AB两位置的要求范围内，则通过更换带盘座下面的滑动垫圈对其高度进行调整。

注意：
带盘座只要一经更换，就必须对其进行高度的检测和调
整。

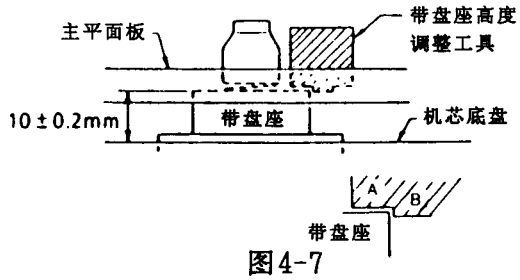


图4-7

快进状态时卷带转矩的检测和调整

●拆去磁带盒室控制机构

●电源接通之前，先用22Ω电阻短接主印刷电路板左侧的TP5001(或跨接销241)和TP5002（或跨接销242）之间。

●转矩测量计的设置

1 设转矩测量计的刻度于0，然后将其转矩测量计安置于卷带盘座上。

2.触按快进(FF)键，置盒室控制机构于快进状态。

●快进转矩的检测

1.用手缓慢地沿卷带方向旋转转矩测量计（2～3秒/转）。

2.检查所测卷带转矩值是否大于69mN·m（700gf ·cm)。

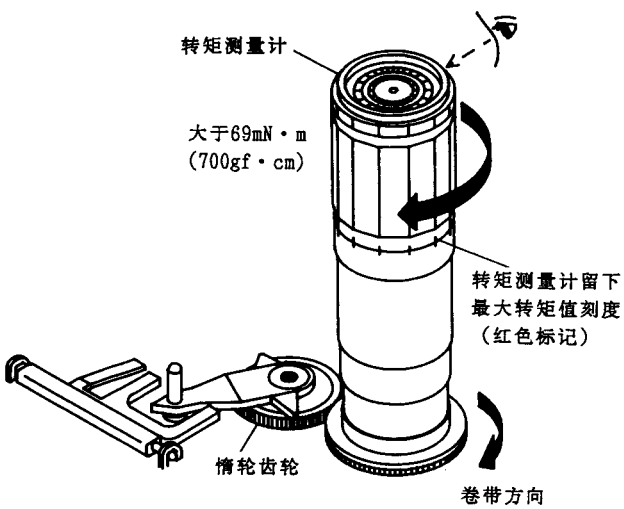


图4-8

●快进转矩的调整

1.如果所测快进卷带转矩超出或不及规定值范围，则需用清洗液清擦主导轴直接驱动马达皮带轮，带盘皮带
及其皮带轮。然后，再测量之。

2.如果清擦后所测快进卷带转矩仍不符规定要求，则需更换带盘皮带。

注意：

1.设置及计测时，须用手向下按住转矩测量计，以免卷带盘的旋转甩飞安置于其上的转矩测量计。

2.作卷带转矩检测时，不宜让带盘座锁扣时间过长。

倒带状态时卷带转矩的检测和调整

●拆去磁带盒室控制机构

●电源接通之前，先用22Ω电阻短接主印刷电路板左侧的TP5001(或跨接销241)和TP5002（或跨接销242）之间。

●转矩测量计的设置

1 设转矩测量计的刻度于0，然后将其转矩测量计安置于卷带盘座上。

2.触按快进(FF)键，置盒室控制机构于快进状态。

●倒带转矩的检测

1.用手缓慢地沿卷带方向旋转转矩测量计（2～3秒/转）。

2.检查所测卷带转矩值是否大于69mN·m（700gf ·cm)。

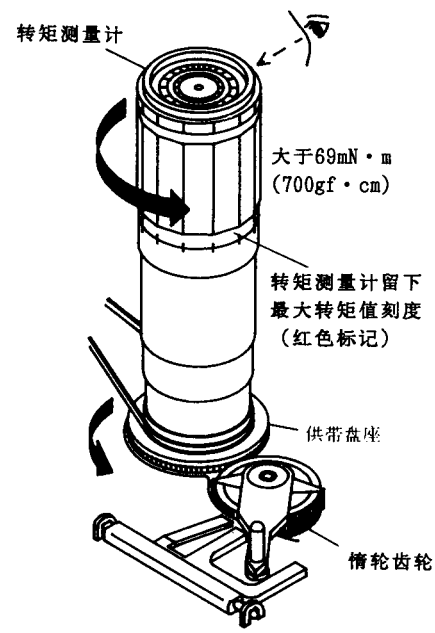


图4-9

●倒带转矩的调整

1.如果所测快进卷带转矩超出或不及规定值范围，则需用清洗液清擦主导轴直接驱动马达皮带轮，带盘皮带
及其皮带轮。然后，再测量之。

2. 如果清擦后所测快进卷带转矩仍不符规定要求，则需更换带盘皮带。

注意：

1. 设置及计测时，须用手向下按住转矩测量计，以免卷带盘的旋转甩飞安置于其上的转矩测量计。
2. 作卷带转矩检测时，不宜让带盘座锁扣时间过长。

再现状态时卷带转矩的检测和调整

1. 拆去磁带盒室控制机构。
2. 电源接通之前，先用22Ω电阻短接主印刷电路板左侧的TP5001(或跨接销241)和TP5002(或跨接销242)之间。
3. 用手揭开盒匣磁带式转矩测量计端口盒盖，用两片胶带张点之以保持其开盖状态。
4. 填装盒匣磁带式转矩测量计于录象机中。
5. 加一500g的重物于盒匣磁带式转矩测量计上。
6. 触按录象(REC)键，设录象机于录象状态。

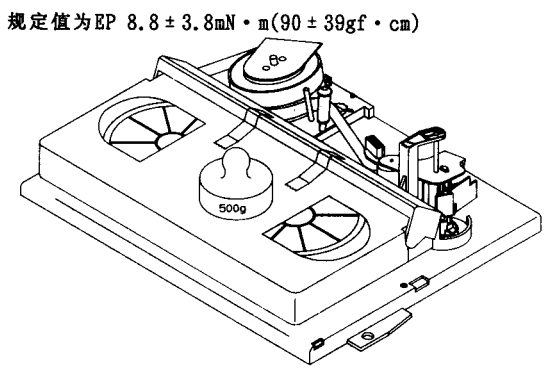


图4-10

●再现卷带转矩的检测

1. 检查所测转矩值是否于8.8±3.8mN·m(90±39gf·cm)。
2. 由于带盘旋转的不均匀性，所测转矩值有可能产生波动现象。这时应取波动值的中心值为其测定值。
3. 触按录象键(REC)，置录象机为录象状态，检查这时的卷带转矩是否也满足上述要求。

●再现卷带转矩的调整

如果所测再现卷带转矩超出或不及其规定值范围，则需更换卷带盘座。

注：压一重物于测量计之上，以防其翘起。

视频搜索倒带状态时卷带转矩的检测和调整

●拆去磁带盒室控制机构

●电源接通之前，先用22Ω电阻短接主印刷电路板左侧的TP5001(或跨接销241)和TP5002(或跨接销242)之间。

●设置

1. 触按再现(PLAY)键，设录象机于再现状态。
2. 触按倒带(REW)键，设录象机于视频搜索倒带状态。

●视频搜索倒带转矩的检测

1. 置转矩测量计于供带盘座之上，逆时针方向缓慢地旋转之(1～2秒/转)，检查所测转矩值是否于14.5 $^{+8}_{-6}$ mN·m(148 $^{+80}_{-60}$ gf·m)的规定范围内。

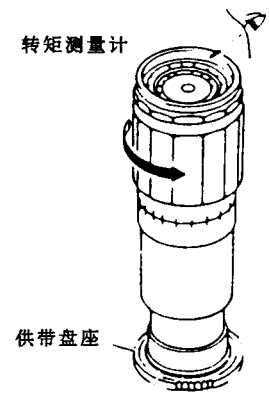


图4-11

注意：

应将转矩测量计牢固地安置于供带盘座之上，否则，所测值并非真实。

●视频搜索倒带转矩的调整

如果所测视频搜索倒带状态时的卷带转矩超出或不及其规定值范围，则需更换卷带盘座。

注意：

由于供带盘旋转的不均匀性，所测转矩值有可能产生波动现象。这时应取波动值的中心值为其测定值。

快进状态时的反向张力的检测

●拆去磁带盒室控制机构

●电源接通之前，先用22Ω电阻短接主印刷电路板左侧的TP5001(或跨接销241)和TP5002(或跨接销242)之间。

●检测反向张力

1.触按快进(FF)键，设录象机于快进状态。

2.置转矩测量计于供带盘座之上，顺时针方向缓慢地旋转之(2～3秒/转)，检查所测转矩值是否于1.5±0.9mN·m(15±9gf·cm)的规定范围内。

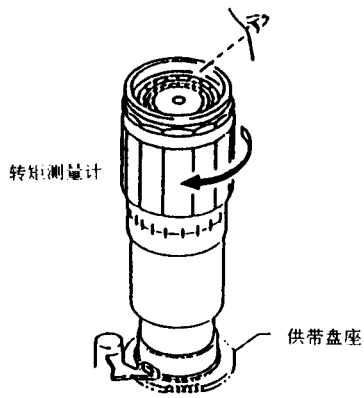


图4-12

注意：

①应将转矩测量计牢固地安置于卷带盘座之上，否则，所测值并非真实。

②在加负荷于带盘座之状态下，转矩测量计所示的数值是真实的转矩测量值。

倒带状态时反向张力的检测

●拆去磁带盒室控制机构

●电源接通之前，先用22Ω电阻短接主印刷电路板左侧的TP5001(或跨接销241)和TP5002(或跨接销242)之间。

●检测反向张力

1.触按倒带(REW)键，设录象机于倒带状态。

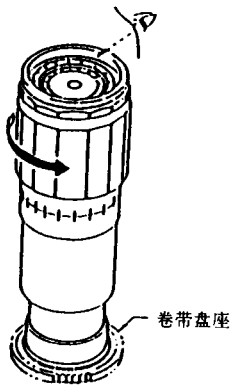


图4-13

2.置转矩测量计于卷带盘座之上，逆时针方向缓慢地旋转之(2～3秒/转)，检查所测转矩值是否于1.3±0.8mN·m(10±5gf·cm)的规定范围内。

注意：

①应将转矩测量计牢固地安置于卷带盘座之上，否则，所测值并非真实。

②在加负荷于带盘座之状态下，转矩测量计所示的数值是真实的转矩测量值。

视频搜索倒带状态时反向张力的检测

●拆去磁带盒室控制机构

●电源接通之前，先用22Ω电阻短接主印刷电路板左侧的TP5001(或跨接销241)和TP5002(或跨接销242)之间。

●检测反向张力

1.触按再现(PLAY)键，设录象机于再现状态。

2.触按倒带(REW)键，设录象机于视频搜索倒带状态。

3.置转矩测量计于卷带盘座之上，逆时针方向缓慢地旋转之(2～3秒/转)，检查所测转矩值是否于4±1.7mN·m(41±17gf·m)的规定范围内。

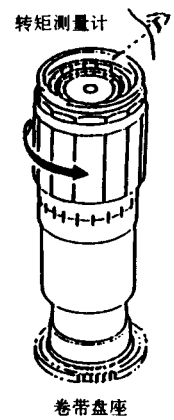


图4-14

注意：

①应将转矩测量计牢固地安置于卷带盘座之上，否则，所测值并非真实。

②在不加负荷于带盘座之状态下，测定之。

紧带轮紧带压力的检测

●拆去磁带盒室控制机构

●电源接通之前，先用22Ω电阻短接主印刷电路板左侧的TP5001(或跨接销241)和TP5002(或跨接销242)之间。

●检测

触按再现(PLAY)键，设录象机于再现状态。

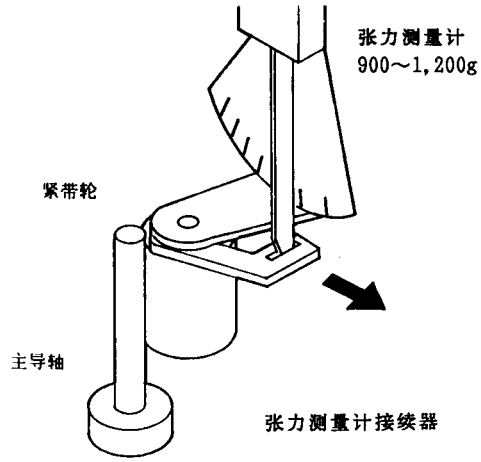


图4-15

1.用一手指拨移紧带轮，使之与主导轴分离。
2.通过套挂张力测量计接续器将张力测量计设置于紧带轮轴之上。
3.慢慢放松施于手指的压力，让紧带轮渐渐靠拢主导轴。在紧带轮与主导轴相触的瞬间，测量计上的读数就是所要计测的压力值。
4.检查所测压力值是否在900～1,200g的规定范围内。

张力杆位置的检测和调整

●拆去磁带盒室控制机构

●电源接通之前，先用22Ω电阻短接主印刷电路板左侧的TP5001(或跨接销241)和TP5002(或跨接销242)之间。

●设置

1.揭开录象带(E-180)盒盖，用两片胶带将开盖固定。
2.装入开盖的录象带带盒于盒室机构。
3.在录象带带盒上加500g的重物。

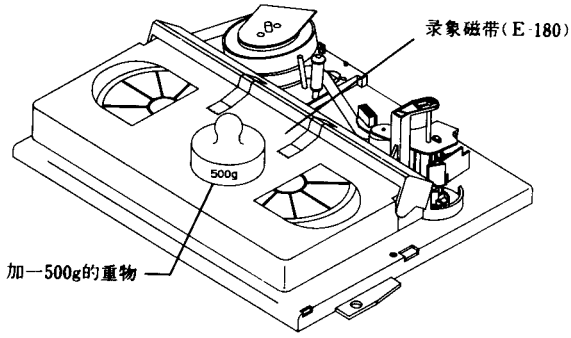


图4-16

●调整

1.安置好录象带带盒，触按录象(REC)键，让挂带机构挂好磁带后，检查张力杆的位置。
2.通过观察检查张力杆左端是否位于与SI辊中心线左端离开0.2mm之位置。其重调方法如下：

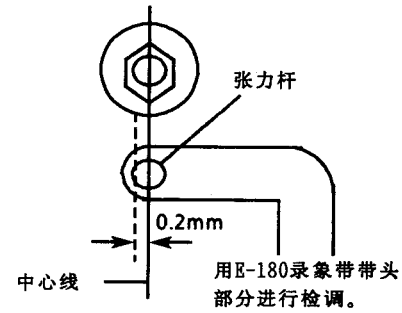


图4-17

①张力杆左端偏移至虚线的左侧时：

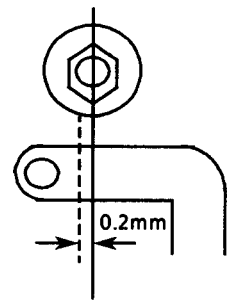


图4-18

1.取出录象带带盒，触按录象(REC)键，让挂带机构作无带装挂动作。插一字口螺丝刀于张力带定位凸轮，顺时针旋转之。
2.装入录象带带盒，再检查张力杆的位置。

②张力杆左端偏移至虚线的右侧时：

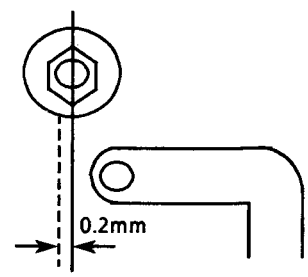


图4-19

1.取出录象带带盒，触按录象(REC)键，让挂带机构作无带装挂动作。插一字口螺丝刀于张力带定位凸轮，逆时针旋转之。
2.装入录象带带盒，再检查张力杆的位置。

注意：

①张力带定位凸轮位于录象带带盒之下，因此上述的调整不能在带盒着位状态下进行。上述调整为下述步骤的重复：作无带装挂动作，调节，装入带盒，检查位置。

②右移张力杆时，顺时针（下图黑色箭头方向）旋转定位凸轮。左移张力杆时，逆时针（下图白色箭头方向）旋转定位凸轮。

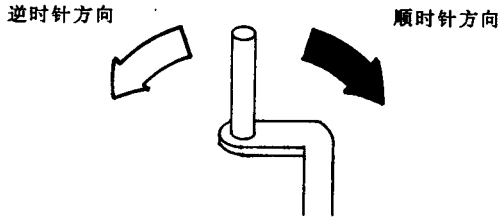


图4-20

③张力杆定位凸轮的调整范围

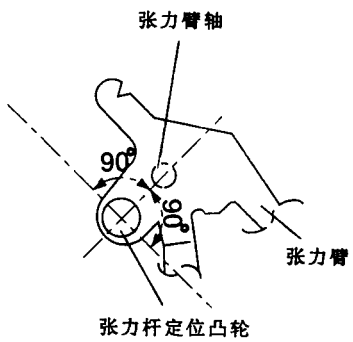


图4-21

以张力臂轴中心至定位凸轮中心为轴的左右90°范围内调整张力杆定位凸轮。

录象/再现状态时反向张力的检测和调整

●拆去磁带盒室控制机构

●电源接通之前，先用22Ω电阻短接主印刷电路板左侧的TP5001(或跨接销241)和TP5002（或跨接销242）之间。

●设置

1.揭开录象带转矩计盒盖，用两片胶带将开盖固定。

2.装入开盖的录象带转矩计于盒室机构。

3.在转矩计盒体上加500g重物。

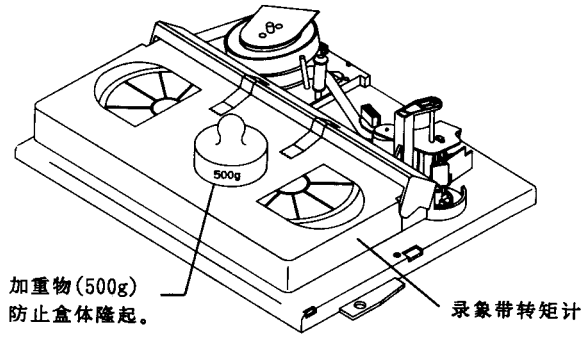


图4-22

●反向张力的检测

1.触按录象(REC)键，设录象机于录象状态。

2.检查所测反张力值是否在32～38g·cm的规定范围内。

注意：

1.确认走带时，不发生磁带高出定位导杆的现象。

2.确认磁带自始至终不发生松弛或损伤现象。

●反向张力的调整

1.录象带转矩计所测读数小于规定值时，向A方向移动张力弹簧。

2.录象带转矩计所测读数大于规定值时，向B方向移动张力弹簧。

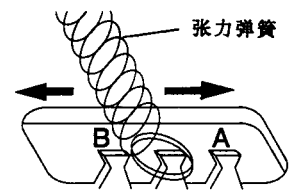
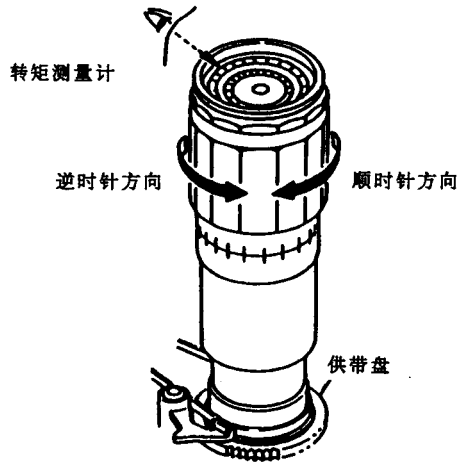


图4-23

制动力矩的检测

●供带侧制动力矩的检测



逆时针方向：10 ± 4mN・m(102 ± 41gf・cm)
顺时针方向：35 ± 20mN・m(357 ± 204gf・cm)

图4-24

1.拆去磁带盒室控制机构。

●电源接通之前，先用22Ω电阻短接主印刷电路板左侧的TP5001(或跨接销241)和TP5002(或跨接销242)之间。

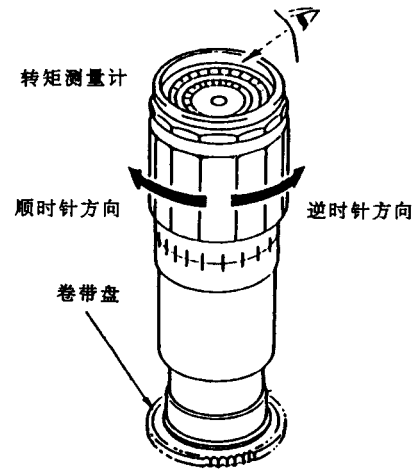
设定方法

1.设转矩测量计的刻度于0，置其于供带盘座之上。
2.转换快进(FF)状态为停止(STOP)状态。

●检测方法

1.用手缓慢地沿供带制动的顺时针方向和逆时针方向旋转转矩测量计，使转矩测量计的刻度盘与供带盘以同样的转速旋转。然后，检查所测值是否满足其规定要求：顺时针方向制动力矩＝35 ± 20mN・m(357 ± 204gf・cm)；逆时针方向制动力矩＝10 ± 4mN・m(102 ± 41gf・cm)。另外，两者所测值还得满足顺时针方向制动力矩至少等于逆时针方向制动力矩的两倍之规定要求。

●卷带侧制动力矩的检测



逆时针方向：10 ± 4mN・m(102 ± 41gf・cm)
顺时针方向：35 ± 20mN・m(357 ± 204gf・cm)

图4-25

1.拆去磁带盒室控制机构。

●电源接通之前，先用22Ω电阻短接主印刷电路板左侧的TP5001(或跨接销241)和TP5002(或跨接销242)之间。

●设定方法

1.设转矩测量计的刻度于0，置其于卷带盘座之上。
2.转换快进(FF)状态为停止(STOP)状态。

●检测方法

1.用手缓慢地沿卷带制动的顺时针方向和逆时针方向旋转转矩测量计，使转矩测量计的刻度盘与卷带盘以同样的转速旋转。然后，检查所测值是否满足其规定要求：逆时针方向制动力矩＝35 ± 20mN・m(357 ± 204gf・cm)；顺时针方向制动力矩＝10 ± 4mN・m(102 ± 41gf・cm)。另外，两者所测值还得满足逆时针方向制动力矩至少等于顺时针方向制动力矩的两倍之规定要求。

●供带侧以及卷带侧制动力矩的调整

1.如果供带侧或卷带侧制动力矩所测值不满足其规定要求，则应清擦供带盘座或卷带盘座制动杆及其垫圈，然后重新检测之。
2.如果清擦后重测制动力矩仍不符规定要求，则需更换主制动器或主制动弹簧。

注意：

主制动器一经更换，则需进行高度的检测与调整(见第77页所述)，以及制动力矩的检测。

音频/控制(A/C)磁头的更换

1.拆去磁带盒室控制机构。

2.设录象机于出盒状态后，拔去其电源引线插头。

●A/C磁头的拆卸

1.松旋倾斜度调整螺丝①。

2.松去方位角调整螺丝②。

3.松去A/C磁头螺丝③。

4.松焊A/C磁头印刷电路板与A/C磁头的连线。

注意：

1.拆装更换后，必须进行磁带走行检查调整(见第86页所述）。拆装过程中，无论是什么情况，都不得用手或他物触碰A/C磁头。

2.松去A/C磁头螺丝时，注意防止其方位弹簧弹出遗失。

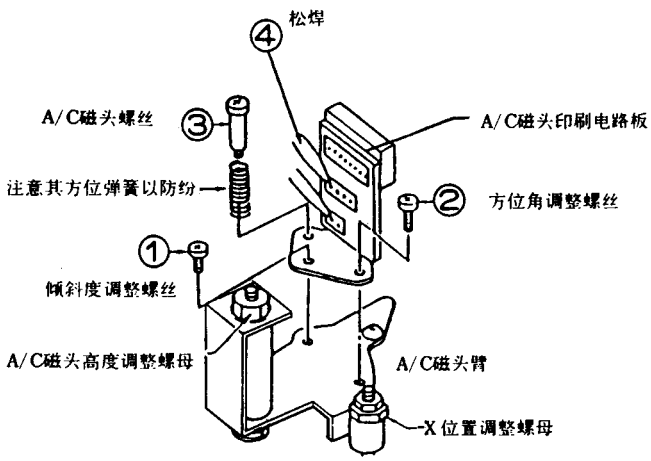


图4-26

●A/C磁头的更换

1.焊接拆卸下的A/C磁头印刷电路板与更换用新A/C磁头的连线。

2.安置A/C磁头组件，使A/C磁头臂与A/C磁头基板大致上相互平行。

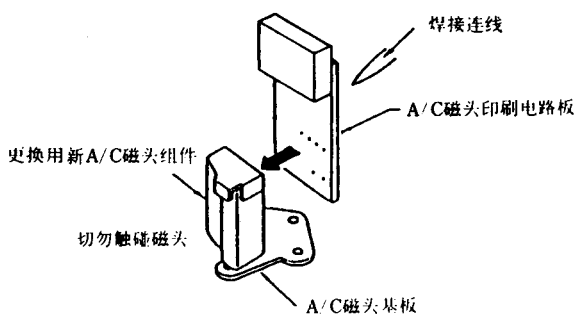


图4-27

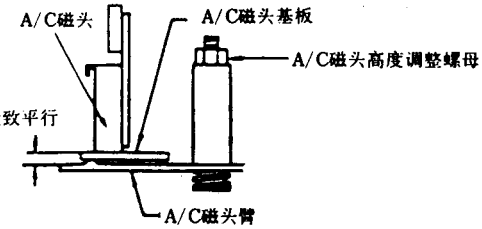


图4-28

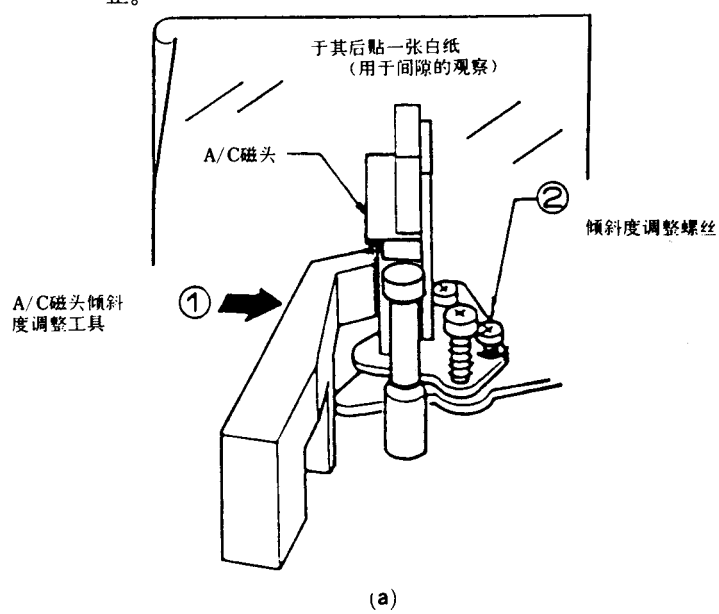
●A/C磁头的调整

〔A/C磁头的倾斜度调整〕

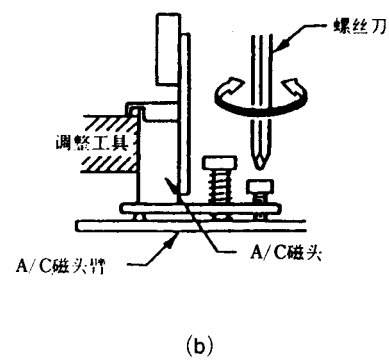
1.设录象机于带盒装填状态。

2.设置A/C磁头倾斜度调整工具①就位。

3.用一螺丝刀缓慢地转动倾斜度调整螺丝②，直至A/C磁头与A/C磁头倾斜度调整工具间的间隙完全消去为止。



(a)

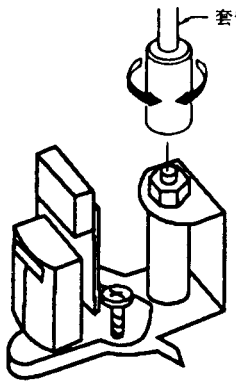


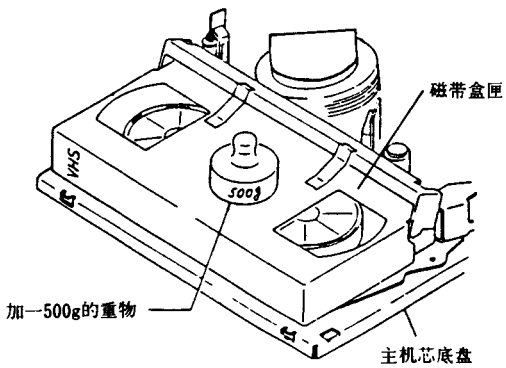
(b)

图4-29

〔A/C磁头的高度粗调〕

●设置



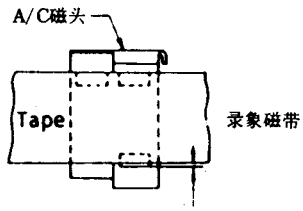


①用专用套管改锥旋转A/C磁头高度调整六角螺母，以对其高度进行粗调，使磁带达至下面所示位置为宜。

②装入录象带带盒于盒室机构。

③触按再现(PLAY)键，设录象机于再现状态。

●调整



旋转高度调整螺母，使控制磁头底边缘低于磁带底边缘
0.3～0.5mm为宜。

图4-30

反转导杆的高度调整

〔反转导杆的高度调整〕

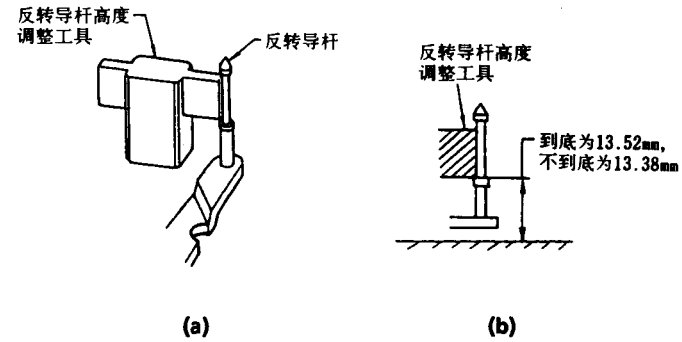


图4-31

1. 先于录象带装挂状态下调整13.38mm端，然后再沿逆时针方向转高度调整36°。
2. 录象带装挂动作结束后，设录象机于再现状态。检查靠近反转导杆处的录象带是否皱折。
3. 用一般市场上贩卖的套管改锥转动高度调整螺母。

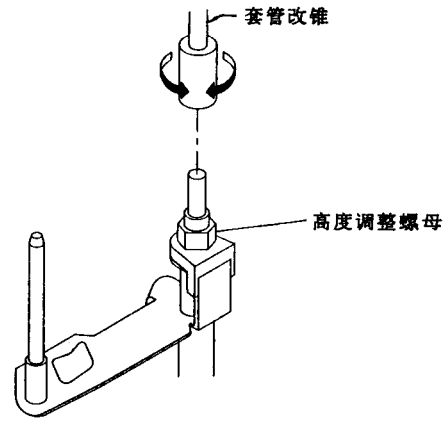


图4-32

磁带走行情况的调整

1. 拆去磁带盒室控制机构。
2. 电源接通之前，先用22Ω电阻短接主印刷电路板左侧的TP5001(或跨接销241)和TP5002(或跨接销242)之间。
3. 检测调整张力杆的位置。（见第81页）
4. 检测调整视频搜索状态时的反向张力。（见第80页）
5. 设定调整A/C磁头倾斜度。（见第84页）
6. 按下述步骤对磁带走行情况进行粗调。

a)连接示波器于再现色彩包络线输出(TP2201)试点。设示波器同步性于外接。这样，再现色彩信号便会被磁头转换脉冲(TP2202)所触发。

b)先松开导辊底部的设定螺丝，然后再用导辊调整专用螺丝刀(JIGDRIVERH-4)稍微将其旋至能轻松圆滑地旋动它之程度。(见图4-33)

c)将校正用磁带(单象管图案)盒匣安置于带盘座上，然后，将录象机设定于再现状态。
(施加一500g的重物于带盒之上，以防走带时带盒的翘起)。

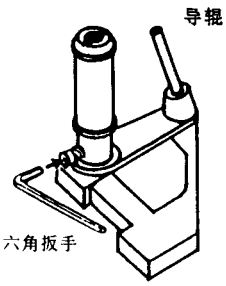


图 4-33

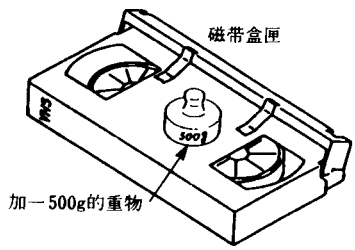


图 4-34

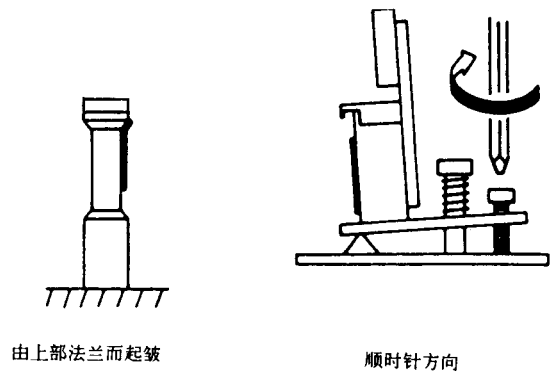
d)于X位置调整状态(见电路调整有关章节所述)，触按跟踪键（＋）和（—），调输出包络线波形从最大至最小，以及从最小至最大。同时观察其波形是否达至平坦状态。

e)如通过上述调节，其输出包络线波形无法达至平坦状态，则需用导辊调整用螺丝刀，对供带侧和卷带侧的导辊进行粗调，直至输出包络线波形达至平坦。

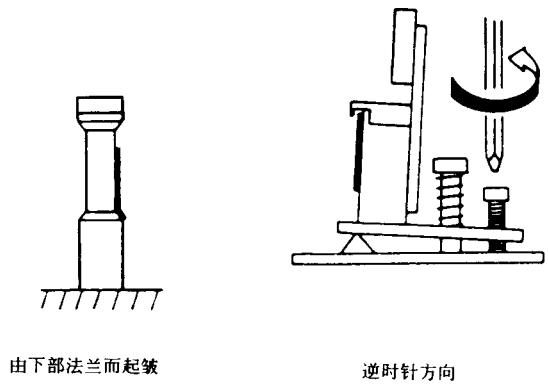
f)用螺丝刀旋转A/C磁头倾斜度调整螺丝而进行A/C磁头倾斜度的调整，以防由上部与下部法兰在磁带上起皱。

1)由上部法兰起皱时：如下图4-35 (a)所示那样顺时针方向旋转倾斜度调整螺丝而进行调整。

2)由下部法兰起皱时：如下图4-35 (b)所示那样逆时针方向旋转倾斜度调整螺丝而进行调整。



(a)



(b)

图 4-35

注意：

1. 将跟踪调节控制钮设定于其中间位置，然后调整X位置调整螺母，使再现色彩包络线波形达其最大，以便进行磁带走行情况的粗调。
2. 粗调过程中，应特别注意对其输出波形等的观察。

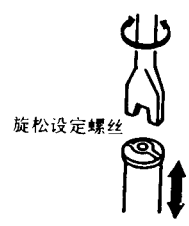


图 4-36

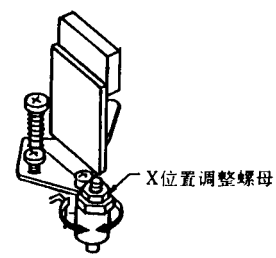


图 4-37

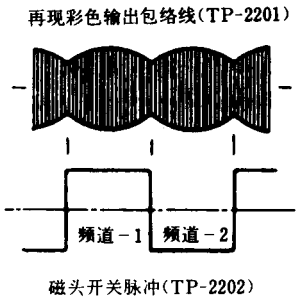


图4-38

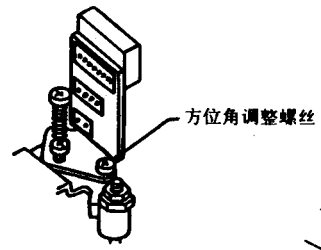


图4-39

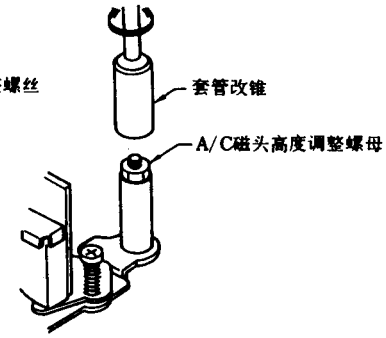


图4-40

7. A/C磁头高度和方位角的调整

a)连接示波器于音频输出端。

b)装入校正用磁带、再现之，让其输出6 kHz的音频信号（其视频信号为单象管图形)。用十字口螺丝刀旋转A/C磁头方位角调整螺丝，使示波器上音频输出达其最大。（见图4-39)。

c)再现校正用磁带，让其输出1kHz的音频信号(其视频信号为彩条图形)。用专用套管改锥缓慢地旋转A/C磁头高度调整螺母，使示波器上音频输出达其最大。

d)重复步骤b)的调整。

e)完成上述步骤后，浇粘合剂(LOCTITE)于方位角调整螺丝和高度调整螺母之上，封固之。

8. 走带系统以及X位置的调整。

a)连接示波器于试点TP2201,作再现彩色包络线输出。设示波器同步于外接。这样，再现彩色信号将被磁头开关脉冲(TP2202)所触发。

b)再现走带检查用校正磁带。

c)触按跟踪键的(＋)或(－)，使输出包络线波形从最大转至最小，然后又从最小转为最大。用高度调整用螺丝刀调整供带盘侧和卷带盘侧导辊的高度，使输出包络线尽可能达至平坦。

d)如果走行中的磁带低于或高于螺旋扫描导前，再现彩色输出便会呈现图4-41所示波形。

e)按第86页步骤6的项目e)要求，调节输出包络线的最大平坦度。

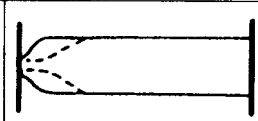
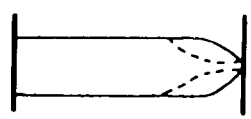
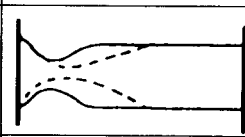
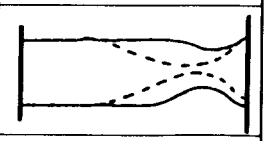
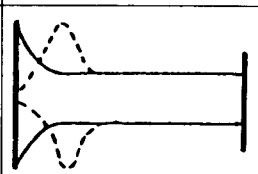
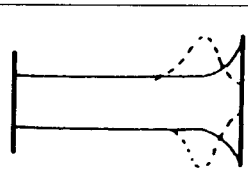
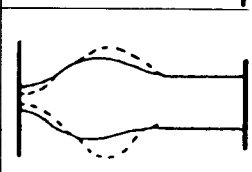
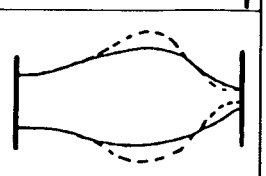
	磁带高于螺旋扫描导前		磁带低于螺旋扫描导前	
	供带侧	卷带侧	供带侧	卷带侧
				
				
调整	顺时针方向旋转供带盘侧导辊(导辊降低)，使其输出波形包络线达至平坦。	顺时针方向旋转卷带盘侧导辊(导辊降低)，使其输出波形包络线达至平坦。	逆时针方向旋转供带盘侧导辊(导辊升高)，让磁带高过螺旋扫描导前。然后，顺时针方向旋转供带盘侧导辊，使其输出波形包络线达至平坦。	逆时针方向旋转卷带盘侧导辊(导辊升高)，让磁带高过螺旋扫描导前。然后，顺时针方向旋转卷带盘侧导辊，使其输出波形包络线达至平坦。

图 4-41

f)触按跟踪键的(+)或(-)，检查包络线波形的平坦度反应。

g)于磁带卸挂状态，用导辊设定螺丝紧固导辊。

h)再现走带检查用校正磁带，检查输出包络线波形是否发生变化。

9.A/C磁头X位置的调整

a)在X位置的调整状态下，用22Ω电阻短接主电路印刷电路板左侧的TP5001（或跨接销241）和TP5002（或跨接销242）之间，使跟踪控制处于中央位置。

b)用螺丝刀旋转A/C磁头X位置调整螺母，以调整A/C磁头X位置，以得磁头开关脉冲下侧的最大包络线。

c)调整再现转换点。

d)再现一录象磁带，检查输出包络线波形以及声音的平坦度是否满足要求。

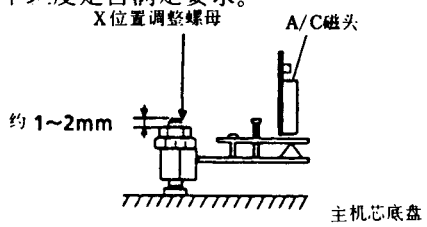


图4-42

主导轴直接驱动马达的拆卸和组装

1.拆去磁带盒室控制机构。

●直接驱动马达的拆卸(按图中所示顺号进行)

1.拔开主电路印刷电路板上的板间插接器的连接。

2.拆去带盘皮带(1)。

3.松去三支紧固螺丝(2)

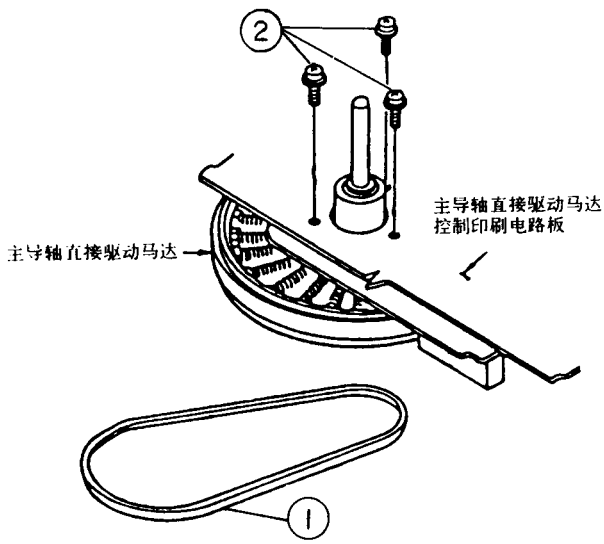


图4-43

注意：

1.组装完毕，转动主导轴直接驱动马达，检查其转动是否圆滑。

2.检测，调整其伺服电路。

2.套好带盘皮带。连接好主电路印刷电路板上的板间插接器。

主导轴直接驱动马达的装拆

1.设装置于磁带出盒状态。

2.拔出电源插头。

●直接驱动马达的拆卸（组装时按此相反顺序进行）

1.拔开FFC电缆线的插接(1)。

2.松去直接驱动马达定子组件的固定螺丝(2)。

3.取出直接驱动马达定子组件(3)。

4.取出直接驱动马达转子组件的固定螺丝(4)。

5.取出直接驱动马达转子组件(5)。

注意：

1.拆卸直接驱动马达定子组件时，磁鼓接地弹簧会弹出接地弹簧的压扣环。
注意切勿丢失其接地弹簧。

2.安装时，必须先将直接驱动马达转子组件的安装孔与下部磁鼓组件的安装孔对齐，然后紧密固定之。

接着再按类似要领安装上部磁鼓。
（将上部磁鼓的槽口与直接驱动马达转子的安装孔对齐。）

3.操作中，切勿碰伤上部磁鼓和视频磁头。

4.安装时，必须小心谨慎，切勿损伤霍尔效应器、直接驱动马达定子、转子以及其它组成部件。

5.更换组装完毕，必须进行再现转换点的调试。

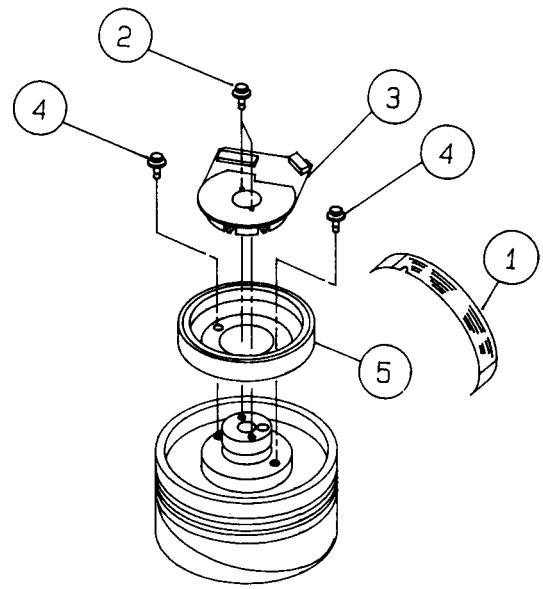


图4-44

上部磁鼓的更换
（此处所述适用于2磁头或4磁头磁鼓之型号。Hi-Fi型式者带有上下磁鼓一体式组件，另属别论。）

注意：
下部磁鼓与上部磁鼓间的嵌合精度以微米所计。因此，更换时必须特加注意。任何外界的尘埃都会影响其装配的精度。

●上部磁鼓的拆卸（按下述顺号进行）

①松去磁鼓的接地刷及其弹簧(1)。
②为压扣环和磁鼓轴(2)的方向标一记号。
③松去压扣环的蜗杆螺丝(M4)(3)。向上取出压扣环。
对磁鼓的接地刷注油加以润滑。使用接地刷时必须特别注意，以免外界的尘埃侵入其内。
④垂直向上提出上部磁鼓(4)。

注意：
1. 拆卸磁鼓马达时，请参照“磁鼓马达的拆装”一节的所述进行。
2. 先用类似于记号彩笔的笔为压扣环和磁鼓轴标记方向记号后，才能松去压扣环。
3. 拆装时注意切勿丢失磁鼓、接地刷以及接地刷弹簧。
4. 切勿用裸手触碰磁鼓表面。
5. 提出上部磁鼓时，必须保持其绝对垂直，缓慢提起之。
6. 紧固螺丝时，不得敲击、打碰。

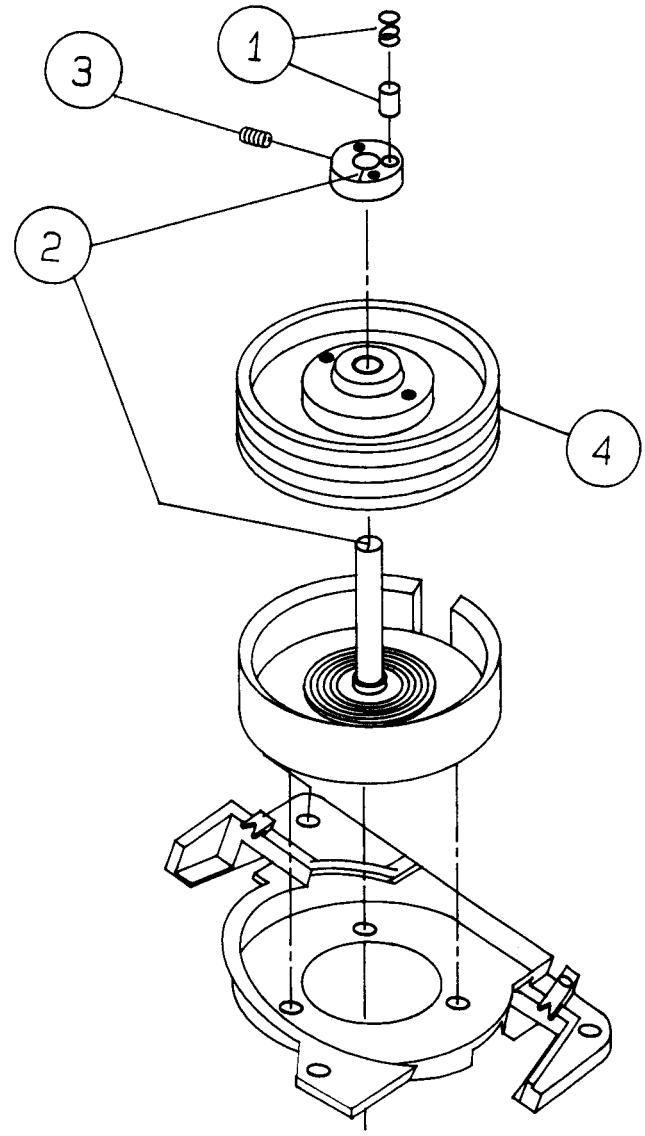


图4-45

●上部磁鼓的更换（适用于2/4磁头式磁鼓）

1.请擦磁鼓轴。

2.调整磁鼓与旋转变压器之间的间隙。调整步骤如下：

1)在更换用上部磁鼓或下部磁鼓组件包装中，配有一些分旋转变压器填隙片。在下部磁鼓轴上贴附最薄的填隙片(0.06mm)。（参见图4-46(a)）

2)套上部磁鼓于磁鼓轴之上。

3)压上压扣环。

4)由上至下地加14.7N(1.5kgf)的压力于压扣环之上（用一般加压计测定）。旋转压扣环的蜗杆螺丝(M4)。

5)用手转动上部磁鼓，细听上部磁鼓内有无摩擦声发生。

6)如有摩擦声发生，用下一厚度的填隙片进行更换。再重复上述1)～5)的步骤，直至无摩擦声发生为止。

7)确认无摩擦声发生之后，再加0.04mm填隙片结束此项调整。

3.将压扣环的方向位置调至与拆卸时标记的位置一致。（参见图4-45）

4.由上至下地加14.7N(1.5kgf)的压力于压扣环之上。旋紧压扣环的蜗杆螺丝。（紧固力矩＝1.18N·m(12kgf·cm)）

5.各就各位地安装好接地刷、接地刷弹簧以及磁鼓马达。

6.更换结束后,先进行走带状态的调整检查(参见86页所述）。然后，再进行下述项目的调整检查。

●再现切换点的调整

●X位置的调整和检查

●SP和LP方式慢放跟踪预设的调整

●更换磁鼓的注意事项

1.磁鼓安装、调整的精度要求极高，处理时应严加谨慎小心。

2.严禁磁鼓表面粘附尘埃，污垢或外部杂物。

3.旋转变压器间隙的调整必须精确、谨慎。其间隙的调整对磁鼓动作性能起有极大的影响作用。

4.组装上部磁鼓时，应保持其孔与磁鼓轴的绝对一致，缓慢套于磁鼓轴之上。切勿用力过度。

5.安装完毕，再次清擦磁鼓。

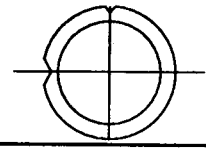
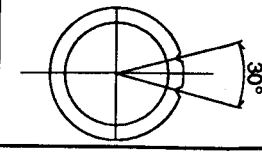
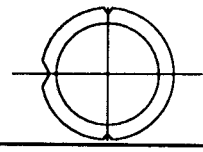
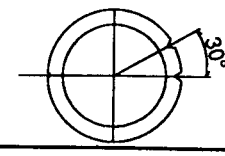
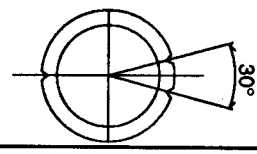
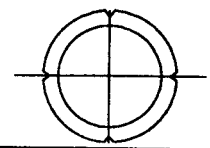
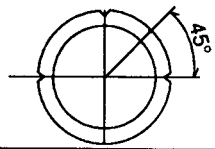
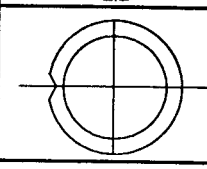
序号	厚度 (mm)	形状	序号	厚度 (mm)	形状
1	t=0.060		5	t=0.100	
2	t=0.070		6	t=0.110	
3	t=0.080		7	t=0.120	
4	t=0.090		8	t=0.030	

图4-46(a)

填隙片的厚度选择

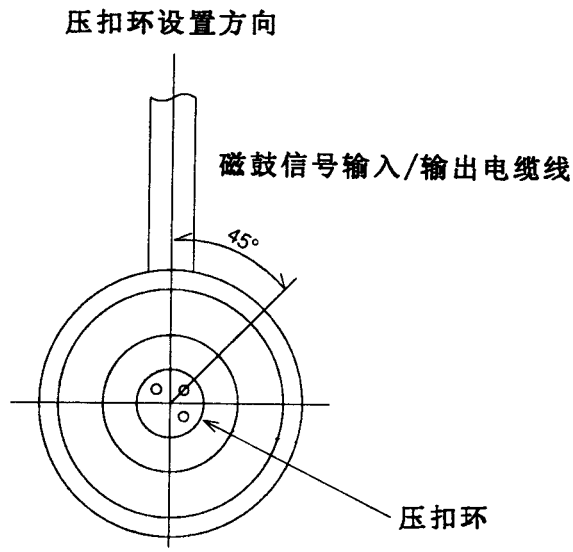


图4-46(b)

需要进行下述配相调整的机械部件的组装

1. 组装紧带轮和紧带轮传动凸轮。（于机芯底盘前面）
2. 安装移行器。（于机芯底盘背面）
3. 安装主凸轮。（于机芯底盘背面）
4. 安装连接齿轮，慢放制动器以及磁带装挂马达。（于机芯底盘背面）

1. 紧带轮与紧带轮传动凸轮（机芯底盘前面）的组装

按下图所示数字的顺序进行组装。

1 紧带轮传动凸轮
2 紧带轮和紧带双动杆
3 开盖柄

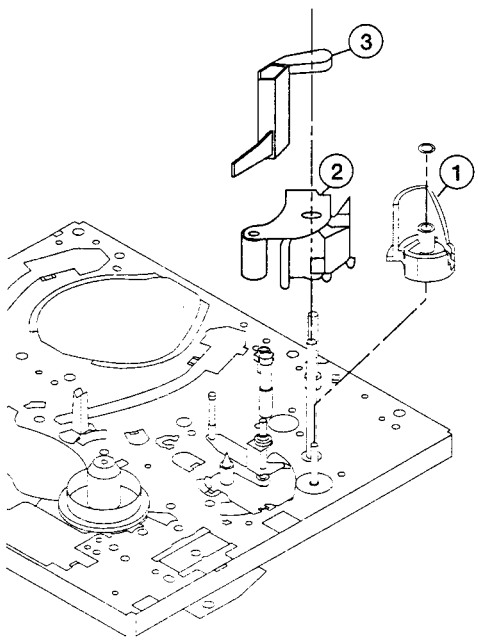


图4-47

① 插入紧带轮传动凸轮

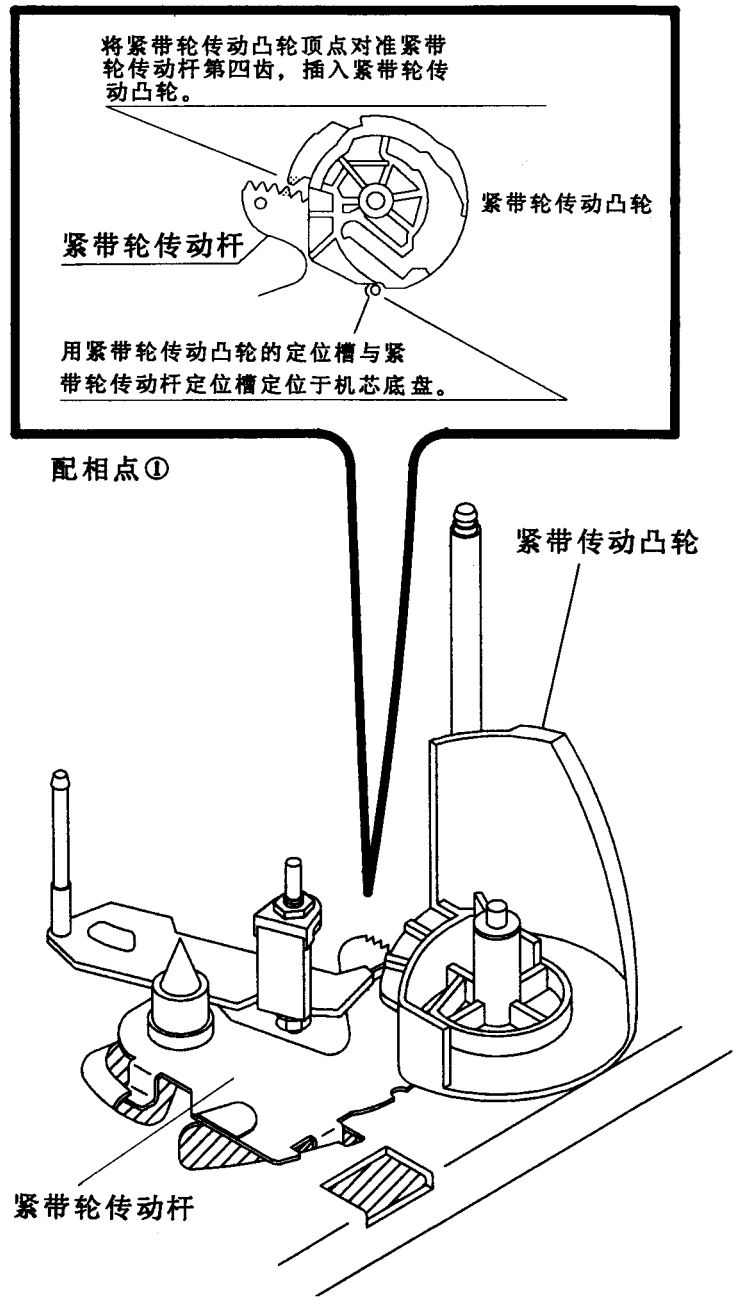


图4-48-1

②插入紧带轮和紧带双动杆

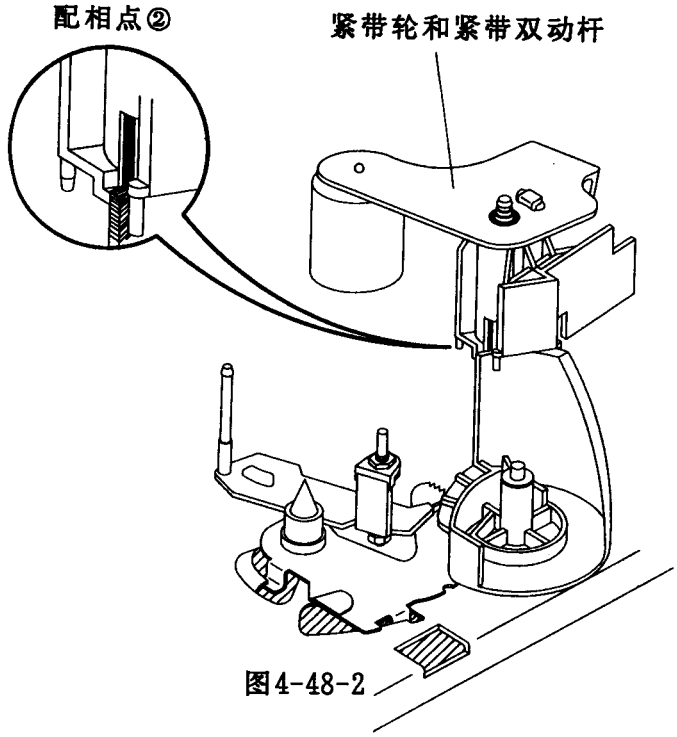


图4-48-2

③插入开盖柄

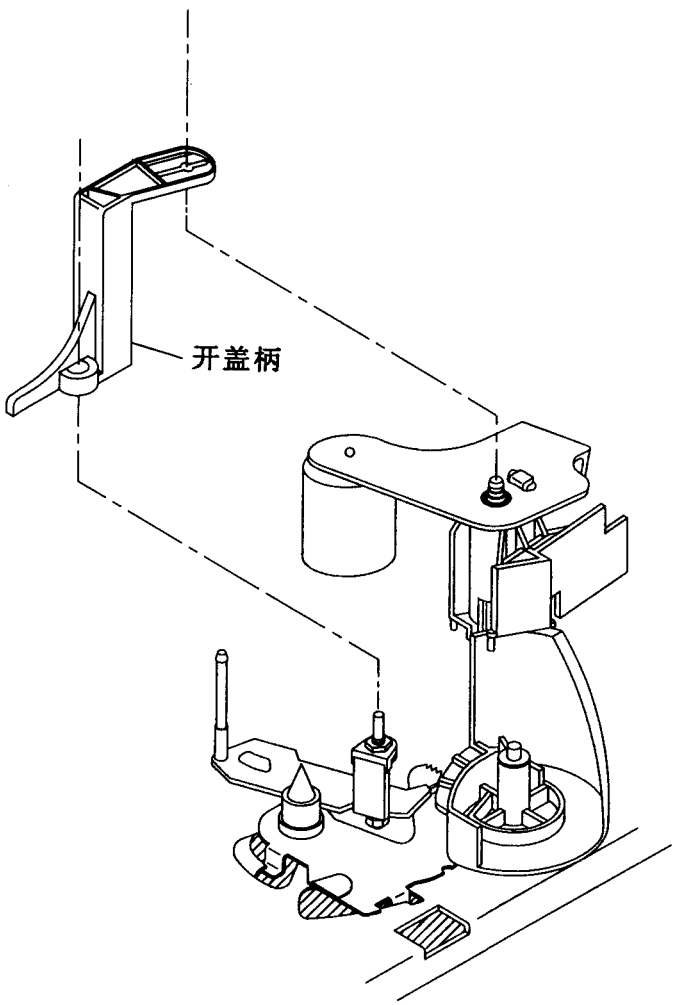


图4-48-3

2. 移行器（机芯底盘背面）的组装

1. 检查磁带装挂齿轮是否于下图所示的插入点(1)处。
2. 按要求安装移行器。这时，必须注意移行器的7个插孔和5个松解钉。
3. 为在插孔(1)处进行配相调整，请见下图的配相点(2)的放大说明。
4. 在插孔(1)和(6)处加上垫圈，紧固移行器。

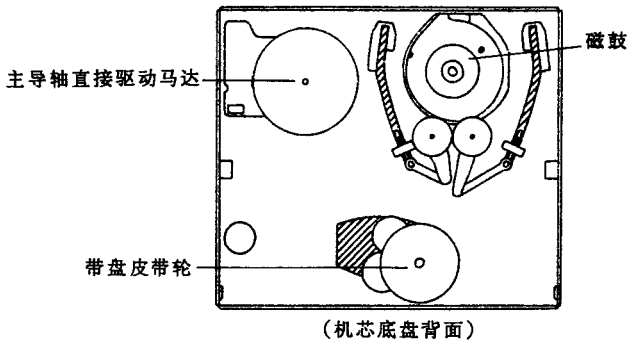


图4-49

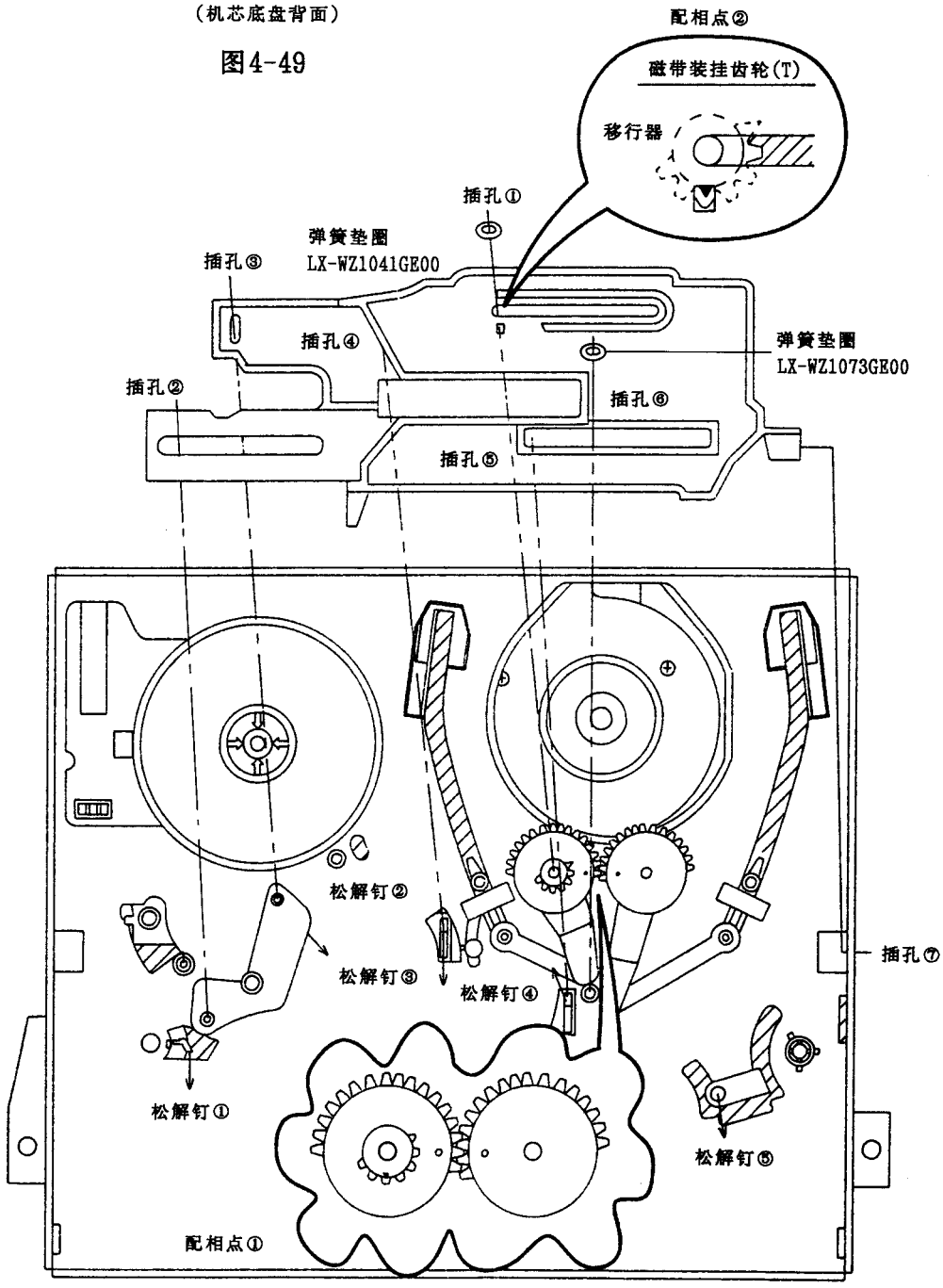


图4-50

3. 主凸轮（机芯底盘背面）的安装

(1)首先检查移行器位置是否满足下图所示要求。

(2)按下图所示要求安装主凸轮。

注意：

按下图所示，调整主凸轮与盒室控制机构传动齿轮间的配相点。

(3)加弹簧垫圈，固定主凸轮。

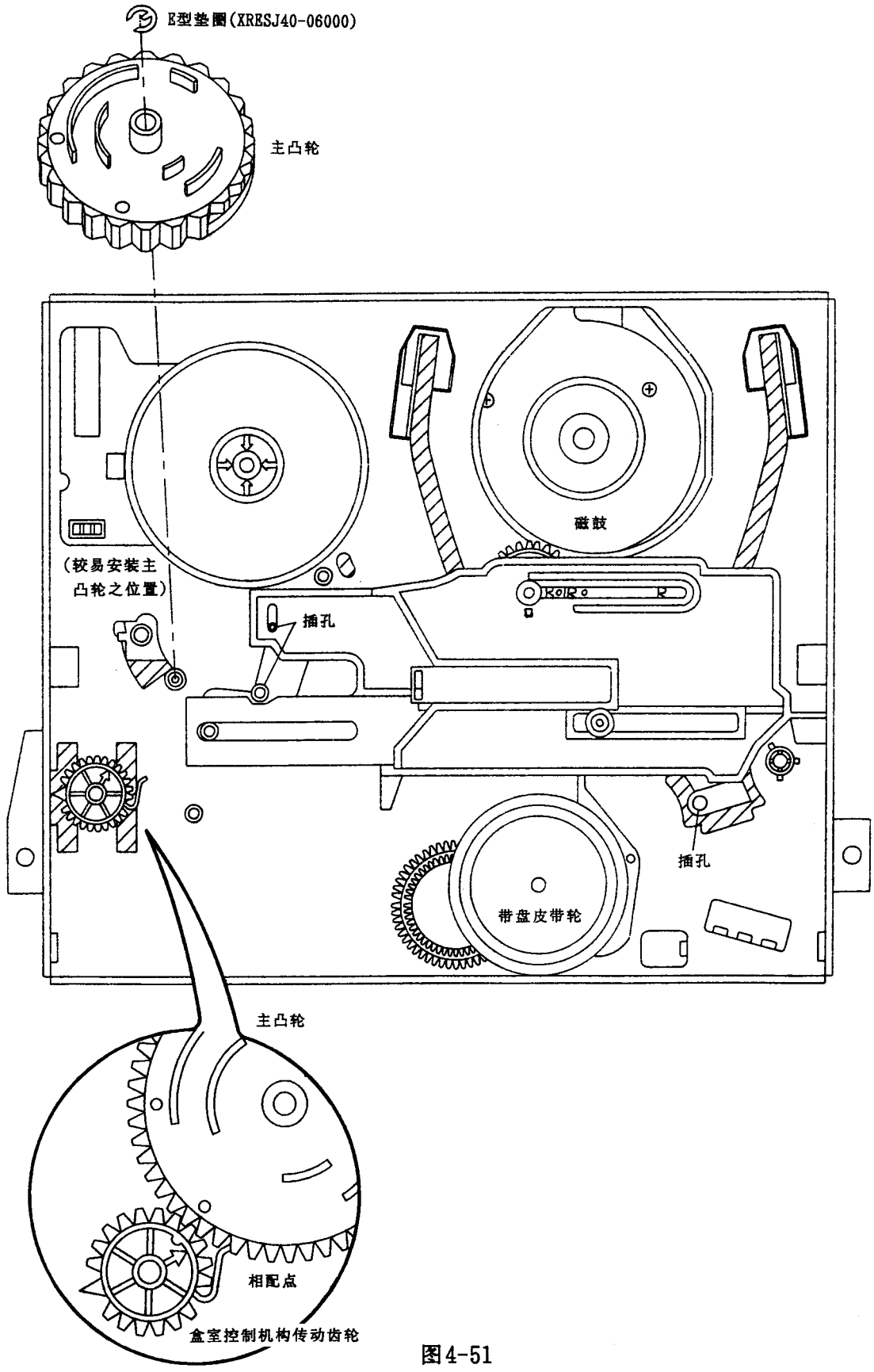


图4-51

4. 连接齿轮，慢放制动器以及磁带装挂马达（机芯底盘背面）的组装

(1)安装连接齿轮。
(2)安装慢放制动器。
(3)安装磁带装挂马达装置。

注意：
让慢放制动器的脚伸出机芯底盘前面，并让其制动弹簧与音频/控制磁头左侧的卷带固定导杆相接。

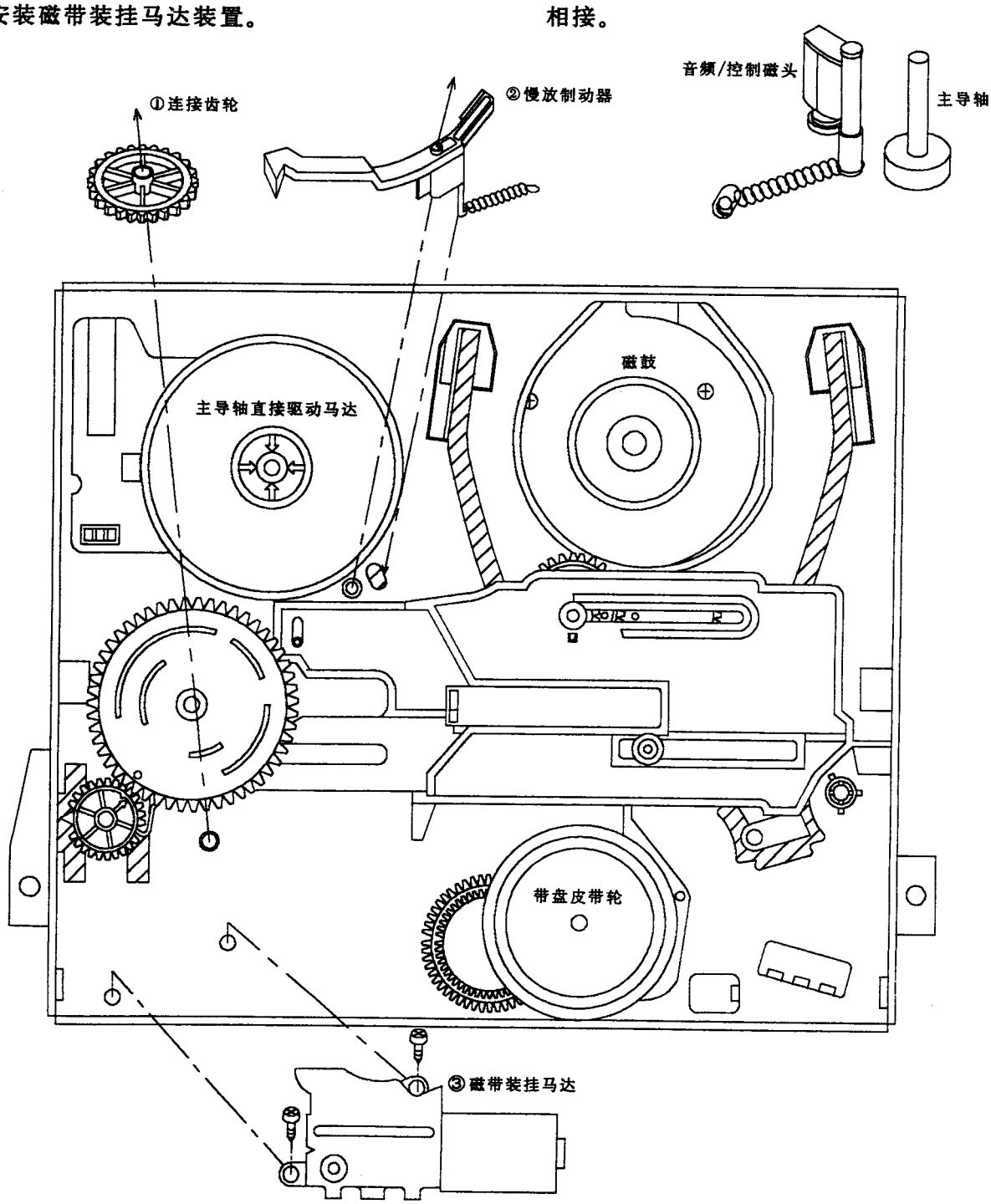


图4-52

注意：
在安装磁带装挂马达之前，应先对相位的配合进行调整检查。其检查方法如下：顺时针旋转连接齿轮检查磁带装挂动作是否相应进行，紧带辊是否相应接带。这些动作配合均十分圆滑时，在将机构返回于上述状态。最后完成磁带装挂马达的安装。

磁鼓装挂马达的更换

●马达的拆卸

松去两支紧固螺丝。

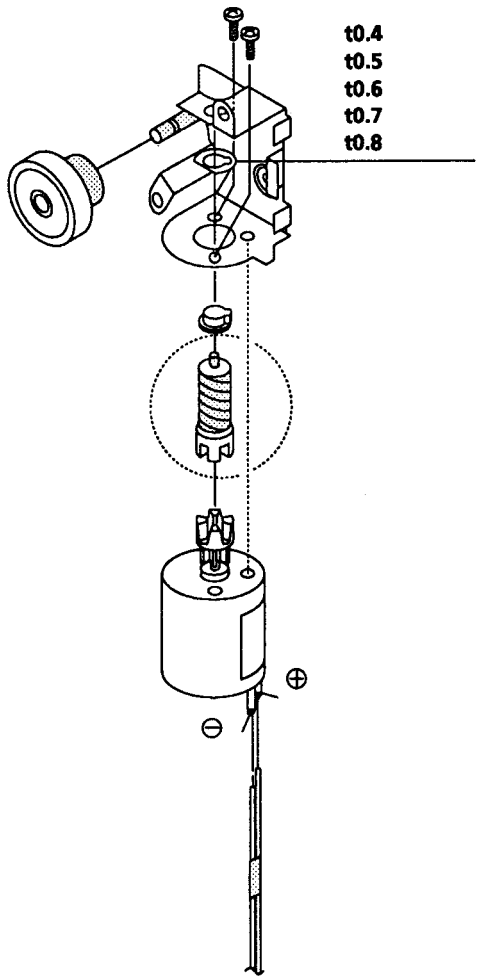


图4-53

●马达的更换

①取出旧的磁带装挂马达。按上图（图4-53）所示要求装换新的磁带装挂马达。

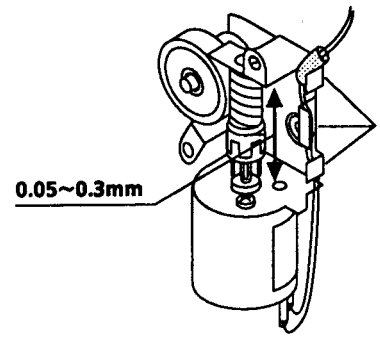
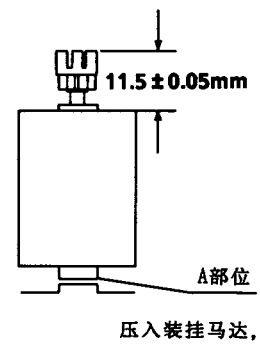


图4-54

②将蜗轮传动的推进间距调整至0.05～0.3mm之间。用规定垫圈进行其间距的调整。



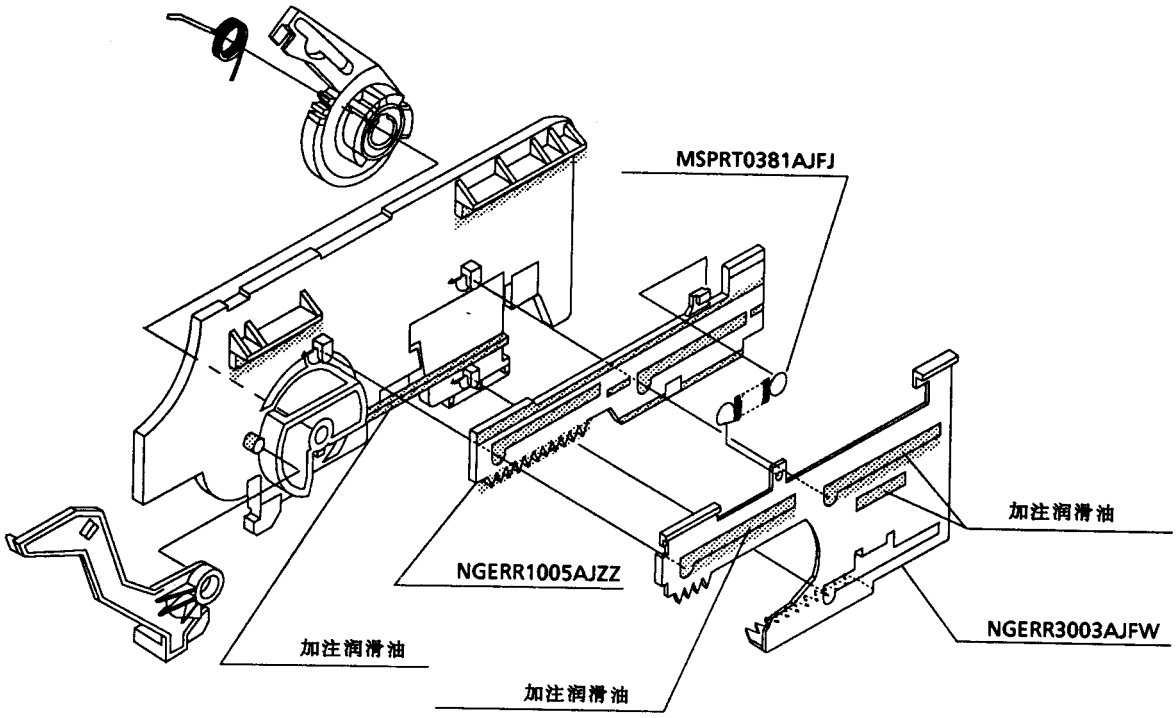
压入装挂马达，让A部位相触。

图4-55

用小于98N(10kgf)的力压入磁带装挂马达皮带轮。检查皮带轮是否离马达的间距是否满足11.5±0.05mm的要求。

盒室控制机构的组装

①右侧传动齿轮和传动杆



配相点

●固定右侧传动齿轮和传动杆于下图所示位置。

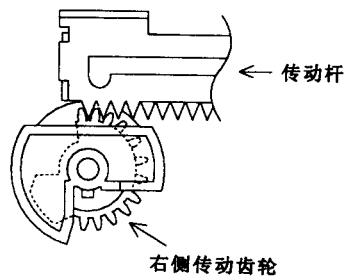


图4-56

②同步齿轮、左侧传动齿轮和右侧传动齿轮

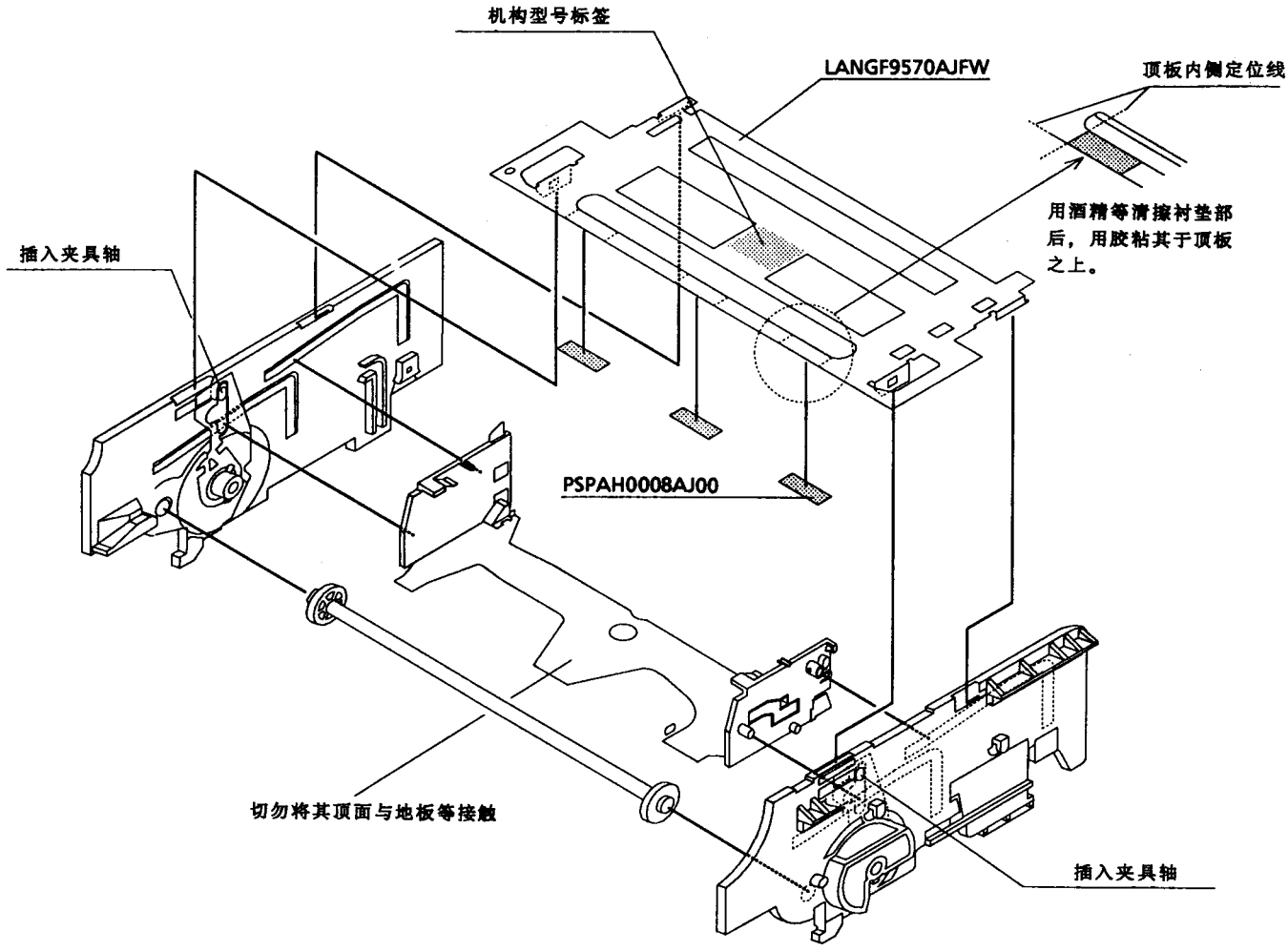


图4-57

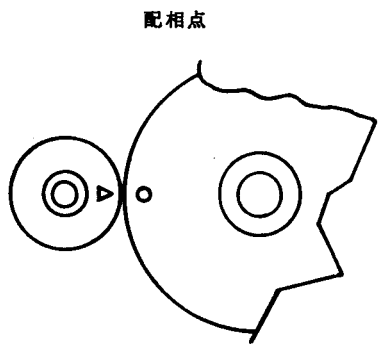


图4-58

将传动齿轮的圆孔与同步齿轮的三角标记（△）对齐。用此要领校正左、右两侧传动齿轮的位置。

注意：
作配相调整时，切勿颠倒左、右两侧传动齿轮的位置。这两只齿轮的一部分不带轮齿，因此可能转出于同步齿轮的范围之外。这种情况发生时，需要重新进行其配相调整。

5 各电路的调试

注：

●调试前

在更换录象机磁头之类的电子元件以及机械部件之后，经常需要进行本节所述的电气调试。

在调试之前，检查机械装置以及所有的电子元件是否处于良好的工作状态，否则，调试不能顺利完成。

●需要的检测用仪器

◎彩色电视机监视器
◎双踪示波器
◎交流毫伏特计
◎计频器
◎校正用磁带(VROCPSV)
◎彩条信号发生器
◎音频信号发生器
◎直流伏特计
◎空白录象带
◎调试用螺丝刀

☆调整注意事项：

定时器电路中的IC804静电可编程式只读寄存器E^2 PROM发生更换时，应按下述要求重编其记忆程序。

按录象机型号而异，IC804的E^2 PROM的记忆程序已于出厂前按规定加以设定。

因此，应根据录象机型号要求，正确设定其记忆功能。

此外，对伺服电路还应进行磁头转换点、慢动作演放以及静止画面的调整。

●主电路控制调节与测试点的位置

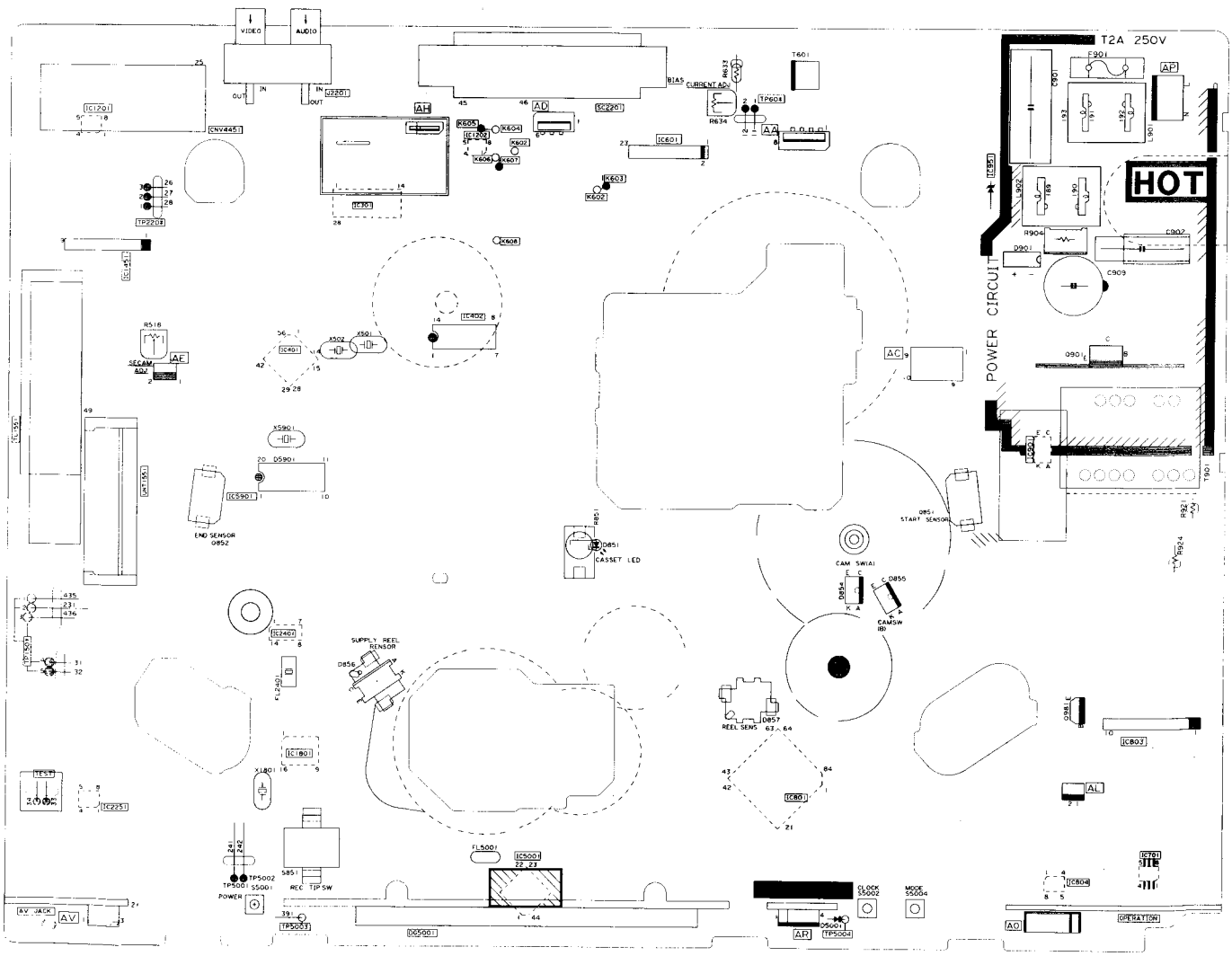


图5-1

伺服电路的调整

磁头转换点的调试

检测仪器	双轨迹示波器 监控用彩色电视机
工作状态	再现
使用磁带	校正用磁带(VROCPSV)
测试点	TP2202(磁头转换点)接频道-1 视频输出插孔端接频道-2 (频道-1触发倾斜开关于(+)，内触发于频道-1)
规定要求	6.5±0.5H（线路）

1.松开前面板。插入校正用磁带(VROCPSV)，再现之。
（再见图象表示于监测用电视机荧屏。）
2.对主电路印刷电路板上左侧的跨接销33和34进行瞬间短接处理。
检查整个荧屏是否按要求点亮并进入调试状态。（见下注）
3.触按再现(PLAY)键。
检查荧屏上是否闪现(约1Hz)表示出“PLAY”（再现）的字样，以示录象机进入自动程序调试动作。
注：
手动程序调试之场合，通过示波器检查输出波形，并通过快进，倒带键的触按将其调至符合规定之程度。
4.确认于再现状态时，“ ▷ ”(再现)的字样是否闪现表示(约1Hz)于荧屏之上。
5.触按停止(STOP)键，让录象机返回至正常工作状态。
6.顺序触按停止(STOP)与全取消(ALL CLEAR)键，将录象机返回标准状态。

注：
①调试状态的设定。
磁头转换点的调整过程中，自动跟踪功能无效。
②盒室控制机构被取出状态下，机械工作状态的设定。
1）几分钟后再重新插入电源引线插头。
2）用22Ω电阻短接主电路印刷电路板左侧的TP5001（或跨接销241）和TP5002（或跨接销242）之间，使跟踪控制处于中央位置。
3）插入电源引线插头。
4）这样，便可得机械动作状态。
几分钟后再重新插入电源引线插头。

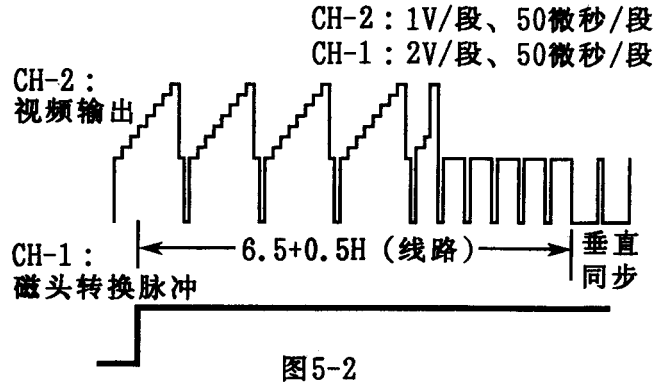


图5-2

SP（标准）/LP（慢速）方式跟踪预设的调整

检测仪器	监控用彩色电视机
工作状态	再现
使用磁带	自录磁带（SP/LP方式） (见下注)
调整点	磁迹跟踪键（+）或(—)
规定要求	监控用彩色电视机荧屏上噪声线最小程度。

1.设录象机于电视台节目接收状态，或向其视频输入端输入视频信号。（见下注②）
2.用遥控器设录象机于SP（标准）走带方式，装入自录磁带录象之。
3.录象后，倒带，再现其录象信号。
4.触按遥控器上的慢放（SLOW）键，慢动作再现之。
5.瞬间短接主电路印刷电路板上左侧的搭接片(33)和(34)。
（检查于测试状态时显象管荧屏是否完全点亮。）
6.观察监控用电视机荧屏，触按磁迹跟踪键(+)或（—），将荧屏上呈现的噪声线（雪花）调至最小程度。
7.触按停止（STOP）键，让录象机返回标准状态。
8.以标准状态再现录象带数秒后，再触按慢放(SLOW)键，检查电视荧屏上的噪声线是否明显。
（LP方式的调整亦按与SP方式的调整方法相同进行之）。

注：
①自录磁带意指于电路调整状态时录象用磁带。
②如RCA或21销插头插于音频/视频输入端，声象信号则不能正常记录。

静止画面FV（虚假垂直同步）的调整

检测仪器	监控用彩色电视机
工作状态	再现状态静止画面
使用磁带	自录磁带(SP方式) (见下注②)
调整点	磁迹跟踪键(+)或(—)
规定要求	电视荧屏上无垂直晃抖

1.装入自录磁带，用SP方式录象后，再现之。
2.触按暂停/静止(PAUSE/STILL)键，静止再现图象。
3.观察监控用电视机荧屏，触按磁迹跟踪键（+）或（—），将荧屏上呈现的噪声线（雪花）调至最小程度。
4.用SP方式再现自录磁带，静止再现图象，检查电视荧屏上的噪声线是否明显。
（LP方式的调整亦按与SP方式的调整方法相同进行之）。

注：
①停电等场合发生时，录象机处复位状态，FV也随之被带回初始状态。这时，FV需重新设定。
②自录磁带意指于电路调整状态时录象用磁带。

亮度/色度信号电路的调整

视频E-E增益的调整

检测仪器	示波器
工作状态	E-E或录象
输入信号	EIA彩条（1.0Vp-p）
测试点	视频输出端
规定要求	1.0V ± 0.1 Vp-p）

1. 接75Ω端电阻于视频输出端，再接示波器两探针于该端电阻两端。（见下注）
2. 向视频输入端输入彩条信号。
3. 让E-E信号振幅达至如图5-3所示的1.0Vp-p的规定要求。

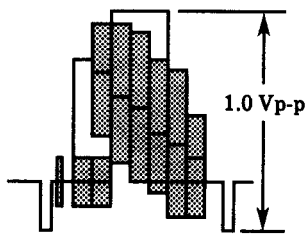


图5-3

注：如不接75Ω端电阻，输出波形幅值应为上述值之两倍。

白色限幅的调整

检测仪器	示波器
工作状态	E-E或录象
输入信号	EIA彩条(1.0Vp-p)
测试点	IC401的销(48)、GND
规定要求	190 ± 5%（见下注）

1. 接示波器于IC401销(48)和接地GND。
2. 设录象机于E-E状态。向视频输入端输入彩条信号。
3. 检查视频信号过调量的限幅是否符合如图5-4所示的190%的规定要求。

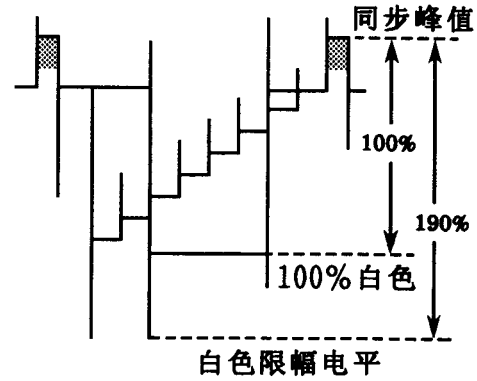


图5-4

注：

从同步峰值至白色峰值，其电平为100%。于白色电平之上，白色限幅电平为90%。

（无黑色限幅调整）

记录电平的检测

检测仪器	示波器
工作状态	录象
输入信号	EIA彩条（1.0Vp-p）
测试点	四磁头系统： IC301的销(26)、GND
规定要求	四磁头系统（SP方式）： 色度（红）信号：48 ± 2mVp-p 同步脉冲顶部：210 ± 10mVp-p
	四磁头系统（LP方式）： 色度（红）信号：33 ± 2mVp-p 同步脉冲顶部：170 ± 10mVp-p

1. 向视频输入插孔端输入彩条信号。设录象机于记录状态。
2. 按上表所示接示波器于测试点。
3. 用一只47μF、16V的电容器短接IC401销(52)和接地GND，以消除FM调频亮度信号。
4. 检查色度（红）信号部分的幅值是否符合图5-5(a)所示的规定要求。
5. 断开步骤3的电容器。
6. 检查同步脉冲顶部部分的幅值是否符合图5-5(b)所示的规定要求。

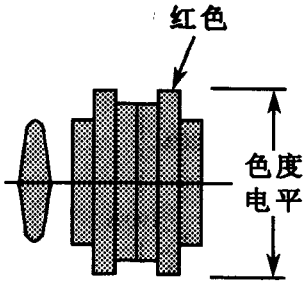


图5-5(a)

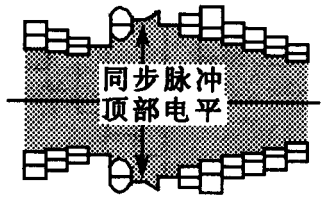


图5-5(b)

再现增益的调整

检测仪器	示波器
工作状态	记录/再现
输入信号	EIA彩条 (1.0Vp-p)
测试点	视频输出端
规定要求	1.0±0.06Vp-p

1. 先确认E-E电平的调试已符合规定要求。
2. 于视频输出插孔端接一只75Ω终端电阻。示波器跨接此终端电阻。（见下注）
3. 向视频输入插孔端输入彩条信号。设录象机于记录状态。
4. 再现记录有输入彩条信号部分的磁带内容。
5. 检查这时的输出信号幅值是否符合图5-6所示的1.0Vp-p的规定要求。

注：

如不接75Ω端电阻，输出波形幅值应为上述之两倍。

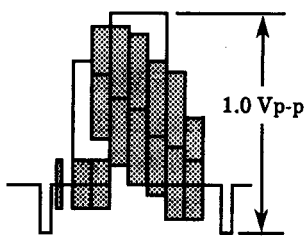


图5-6

音频电路的调整

E-E电平的检测

检测仪器	交流毫伏电压计
工作状态	E-E/记录
输入信号	1KHz、-8.0dB（于RCA式插孔）。 1KHz、-3.8dB（于21销式插孔）。
测试点	音频输出插孔端
规定要求	-8.0 ± 2dB（于RCA式插孔）。 -3.8 ± 2dB（于21销式插孔）。

1.接示波器于音频输出插孔端。
2.向音频输入插孔端输入上表所示的音频信号。
3.设录象机于E-E或记录状态。
4.检查其输出电平是否符合上表的规定要求。

音频再现电平的检测

检测仪器	交流毫伏电压计
工作状态	再现
输入信号	校正用磁带（VROCPSV） （1kHz电平控制信号）
测试点	音频输出插孔端
规定要求	$-9\ ^{+2dB}_{-1dB}$

1.再现校正用磁带（VROCPSV、1kHz电平音频信号）。
2.接交流毫伏电压计于音频输出插孔端。
3.检查其输出电平是否符合上表的规定要求。

音频记录电平的检测

检测仪器	交流毫伏电压计
工作状态	记录/再现
输入信号	1kHz、-8.0dB(于RCA式插孔) 1kHz、-3.8dB(于21销式插孔)
测试点	音频输出插孔端
规定要求	-8 ± 3dB（于RCA式插孔）。 -3.8 ± 3dB（于21销式插孔）。

1.接示波器于音频输出插孔端。
2.向音频输入插孔端输入上表所示的音频信号。
3.记录其音频信号，再现之。
4.检查其输出电平是否符合上表所示的规定要求。
所测值不符规定要求之场合，对偏流值进行检测。（见下述“线性音频偏流的调试”）

音频偏流的调试

检测仪器	交流毫伏电压计
工作状态	记录
输入信号	不用
测试点	TP601（+）～TP602（—）
调整点	R634：偏流控制
规定要求	2.5 ± 0.1mVrm

1.接交流毫伏电压计于TP601(+)和TP602(—)。
（TP602作为接地端）
2.设录象机于记录状态。
3.调节R634，使交流毫伏电压计所测读数达至2.5 ± 0.1mVrm的规定要求。

消磁电压和振荡频率的检测

检测仪器	示波器
工作状态	记录
测试点	完全消磁磁头
调整点	T601
规定要求	70 ± 5kHz、不小于40Vp-p

1.设录象机于记录状态。
2.接示波器于完全消磁磁头两端。
3.检查完全消磁磁头两端的消磁电压以及振荡频率是否分别符合大于40Vp-p及等于70 ± 5kHz的规定要求。

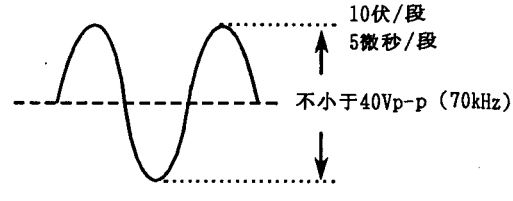


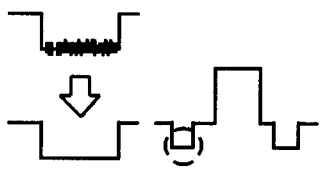
图5-7

射频RF电路的调整

射频自动增益电路的调试(除G/S型式以外)。

检测仪器	示波器
工作状态	画面清楚的电视台播放节目的接收状态。
测试点	TP1502（信号）、 TP1501（接地）。
调整点	VR001：AGC调节。
规定要求	正好于收缩之前（见图5-8）

1. 调录象机于图象清楚的电视台播放节目的接收状态。
   （输入场强：于天线端处为80dBμV）
2. 接示波器于测试点的TP1502(信号)和TP1501（接地）。
3. 观察示波器所示输出端波形。
   调节中频装置中的VR001（AGC调节），使示波器荧屏与其输出波形接近同步。



正好于收缩之前

图5-8

射频自动增益控制电路的调试(仅限G/S型式)。

检测仪器	直流电压计 VHF信号发生器
工作状态	E12频道的射频信号 (VHF信号发生器发生) (87.5%调制的EBU彩条信号)
测试点	TP1503(+)、TP1501(-)
调整点	VR001：AGC调节
规定要求	4.5±0.1V (用VTUVTSH6HZ501调谐器时) 4.5±0.1V (用VTUOF4EG-721F调谐器时) 4.5±0.1V (用VTUOF4EG-721F调谐器时)

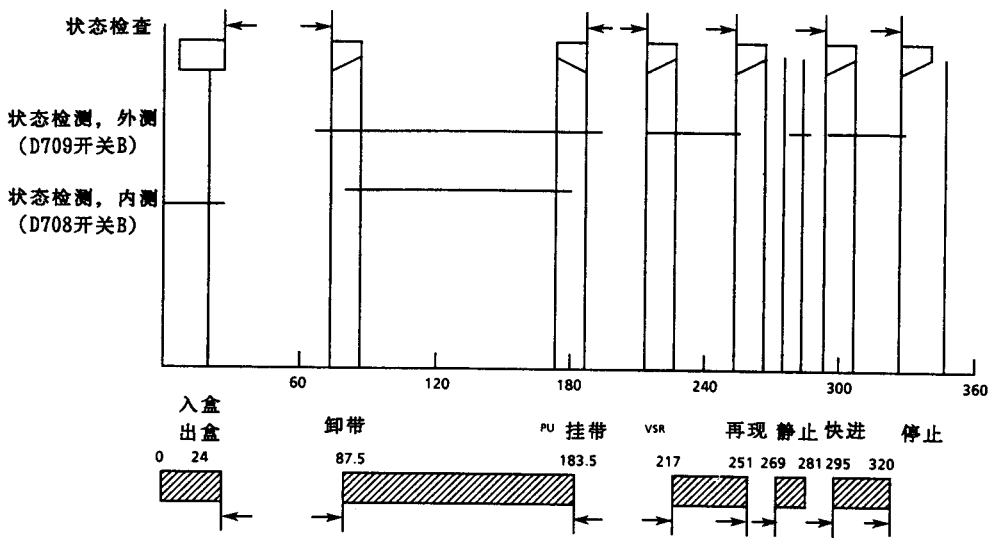
1. 接收E12频道信号（87.5%调制彩条信号），其输入场强，于天线端处应为70dBμV。
2. 接直流电压计于测试点的TP1503(+)和TP1501(-)。
3. 调节中频装置内的VR001(AGC调节)，使所测电压值达至规定要求。

6. 机械动作流程图及机械故障检修

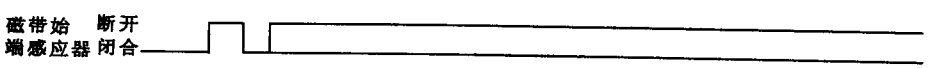
机械动作流程图

＊该流程图说明本录象机机械动作的大致概要，而不对其作详细具体的说明。

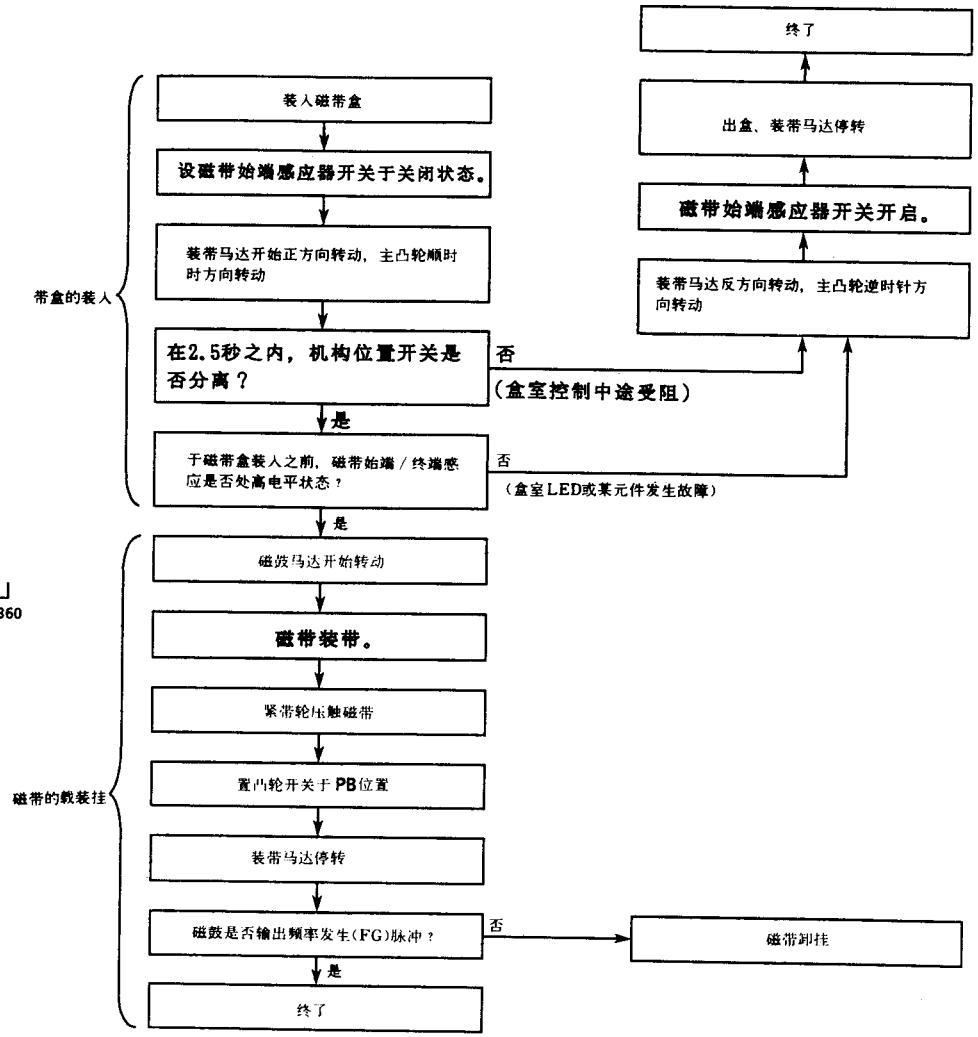
主凸轮动作



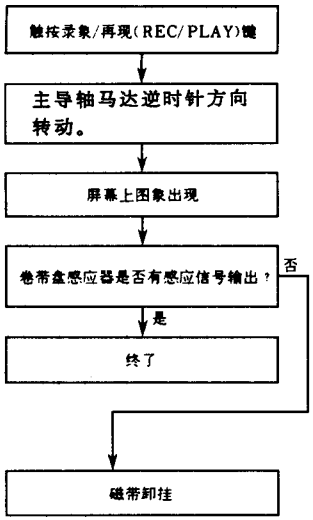
	CS/EJ						ULD	PU LD			VSR		PB	STL		FF		STOP
状态检测、外侧	0	0	0	0	0	1	1	1	1	0	1	1	0	1	0	1	1	0
状态检测、内侧	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
磁带始端感应器	1	1	0	1	1 or 0													



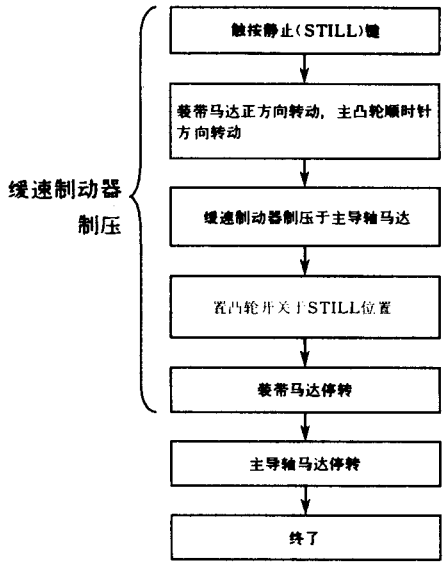
装入录象磁带→动作停止



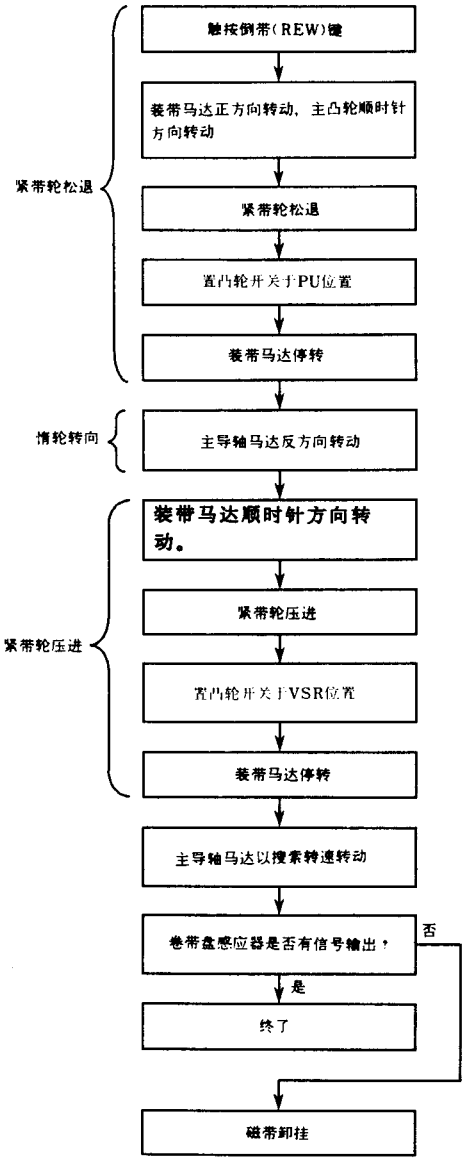
停止状态→录象/再现



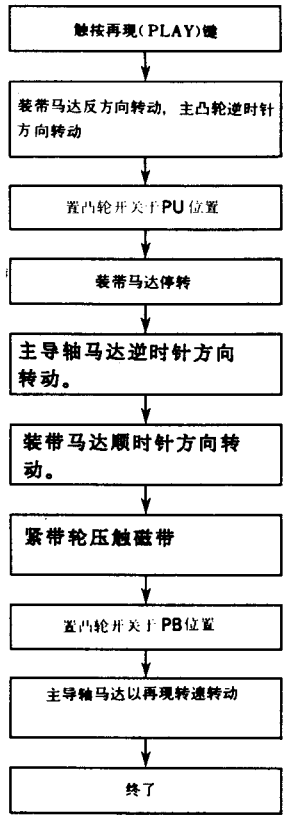
再现状态→静止



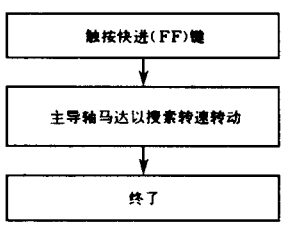
再现→视频搜索倒带



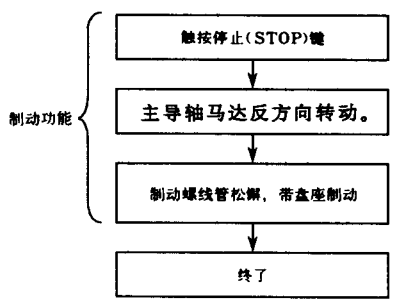
视频搜索倒带→再现



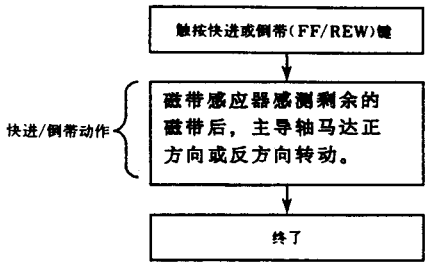
再现→视频搜索快进



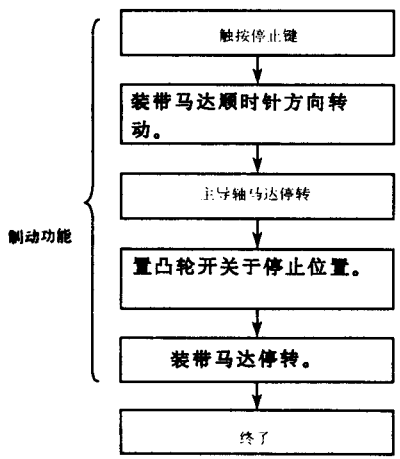
快进/倒带→停止状态



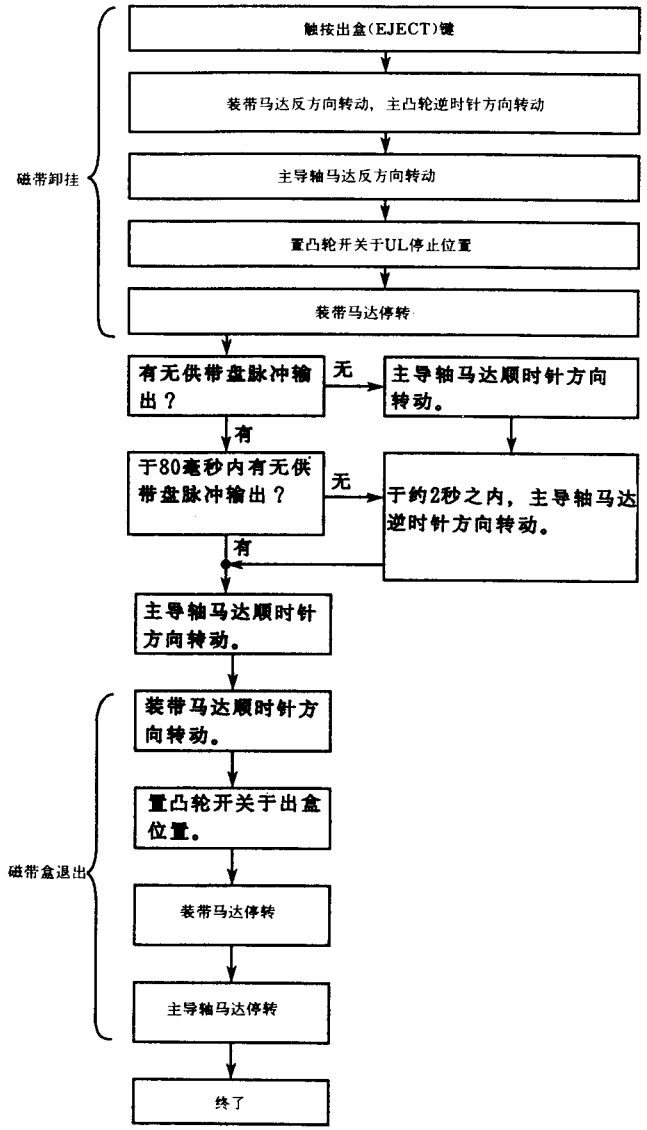
停止状态→快进/倒带



录象/再现→停止状态

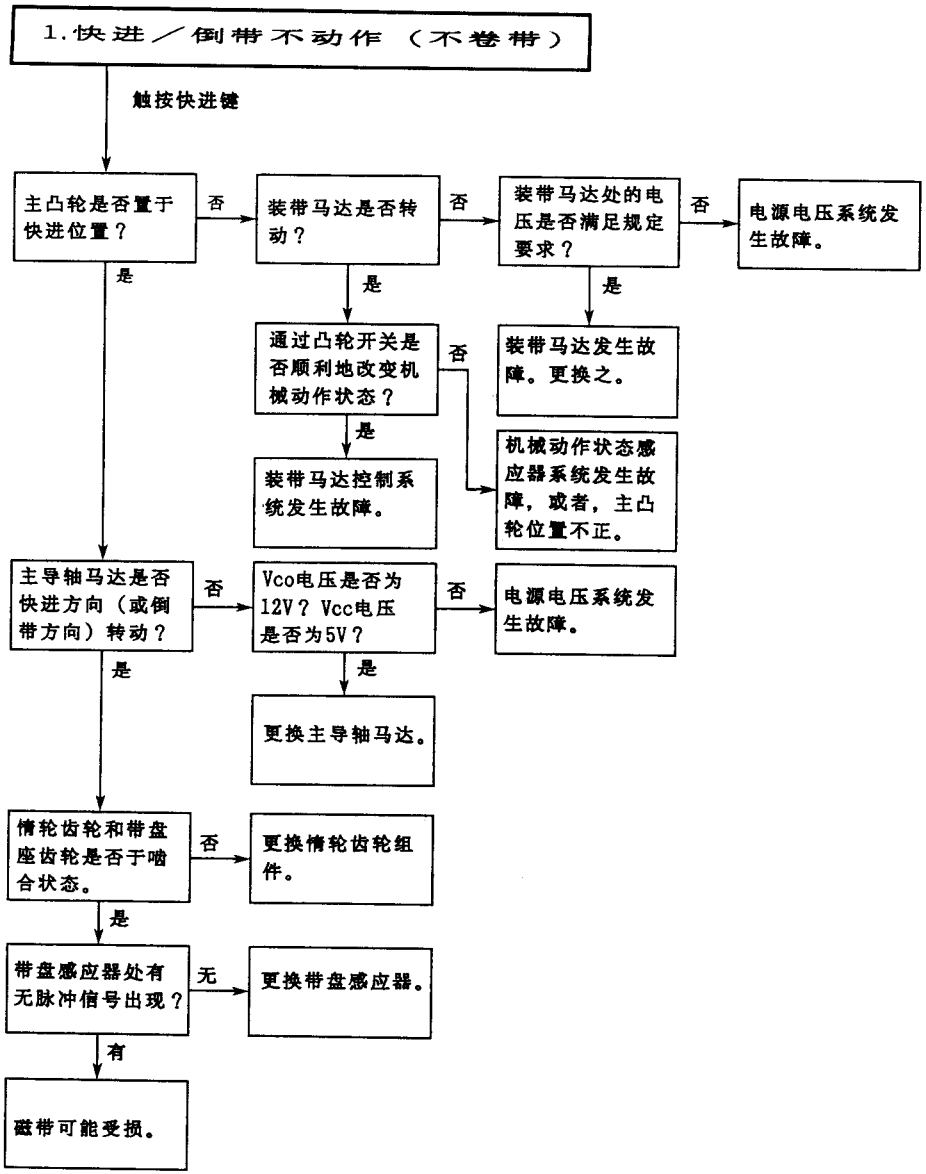


停止状态→出盒

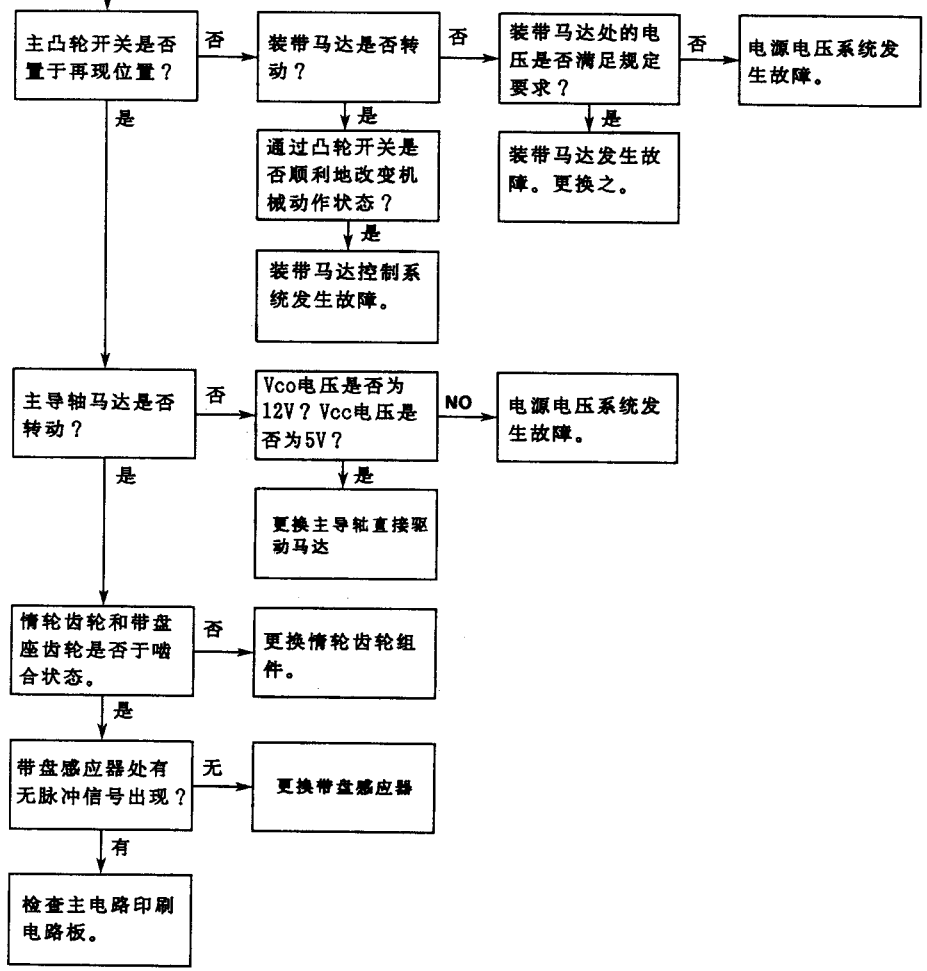


机械故障检查

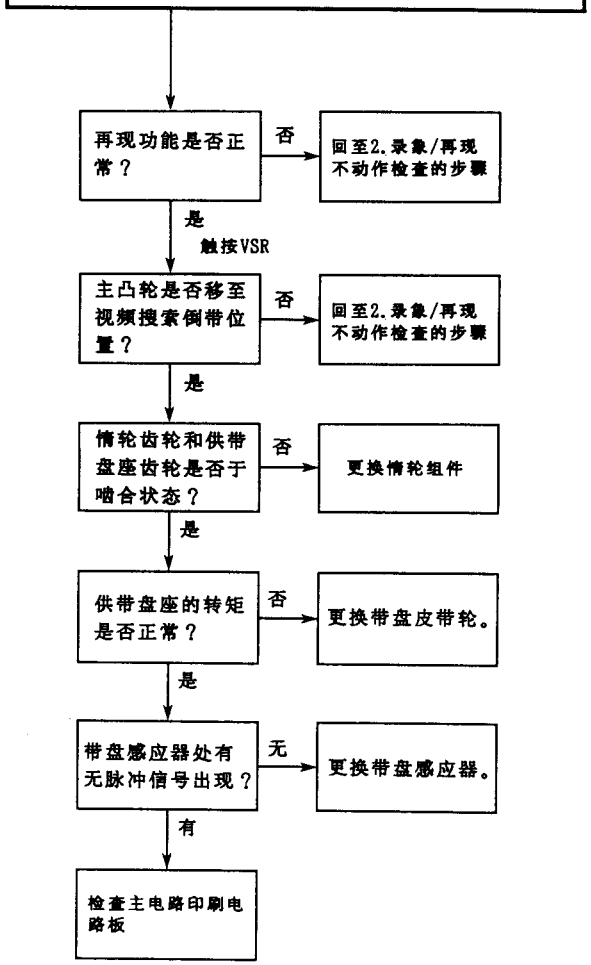
1.快进／倒带不动作（不卷带）



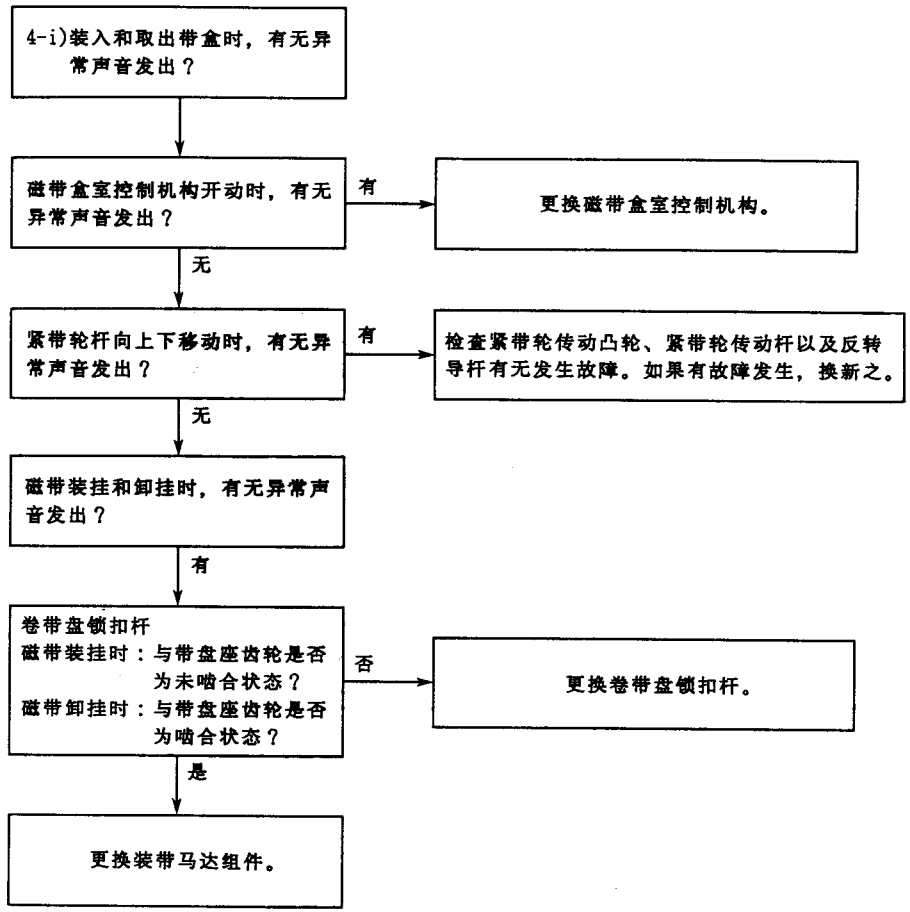
2.录象／再现不动作（状态解除）

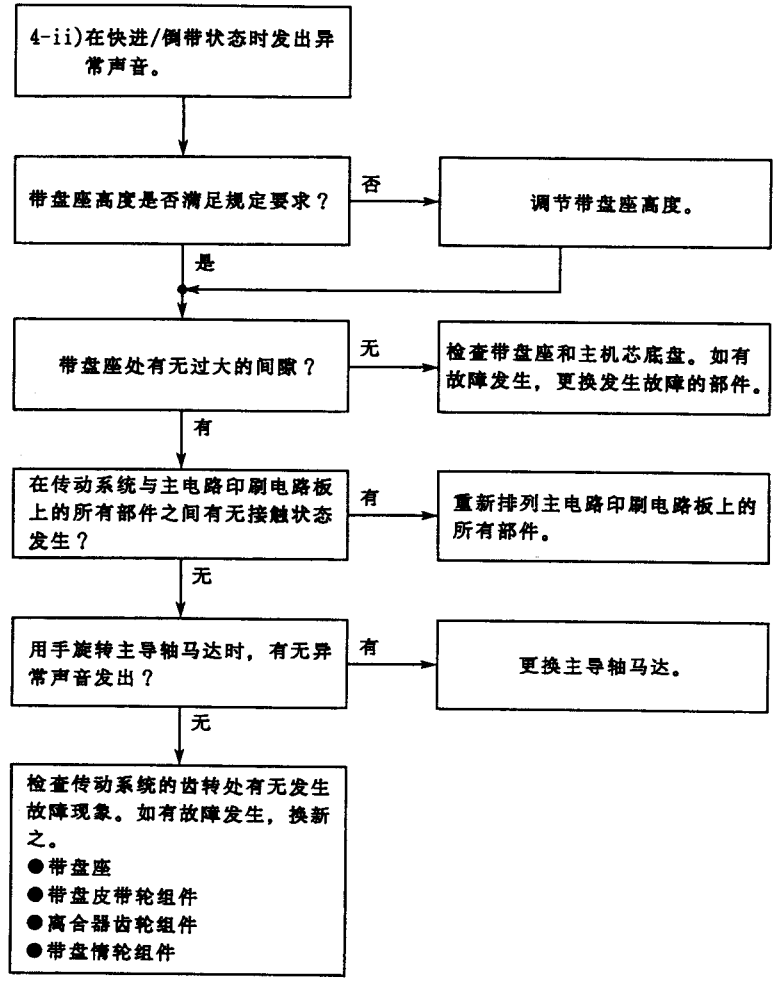


3.视频搜索倒带不动作（不卷带）



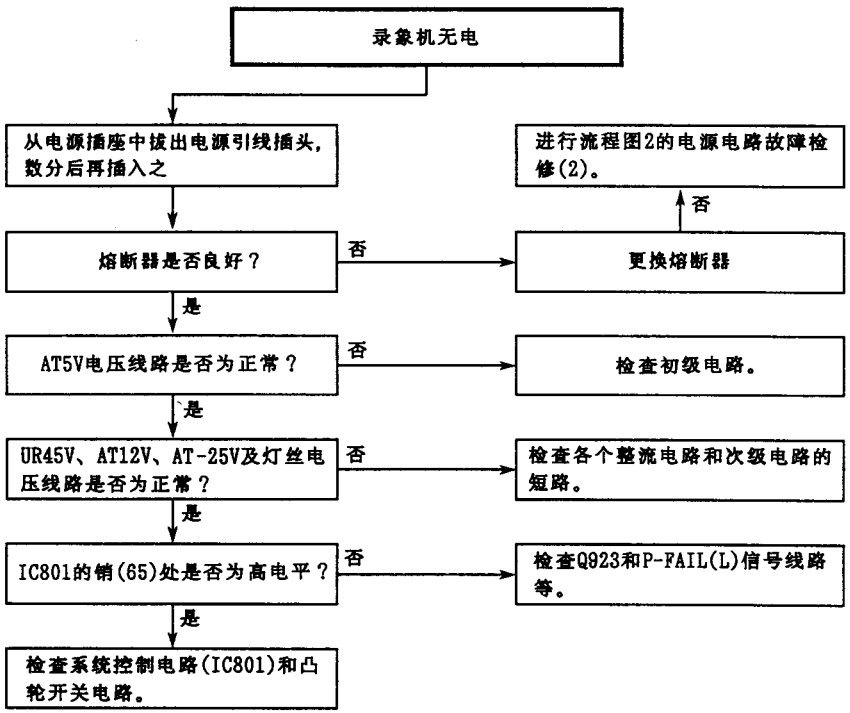
4.于各工作状态均发出异常声音



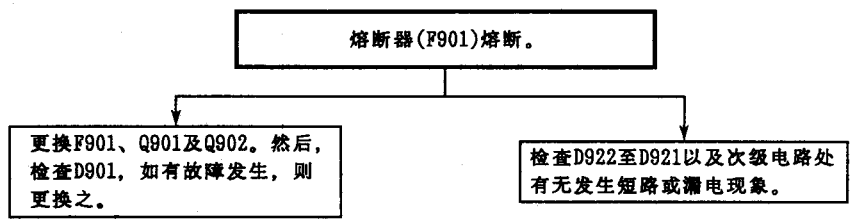

4-ii)在快进/倒带状态时发出异常声音。
带盘座高度是否满足规定要求？
否
调节带盘座高度。
是
带盘座处有无过大的间隙？
无
检查带盘座和主机芯底盘。如有故障发生，更换发生故障的部件。
有
在传动系统与主电路印刷电路板上的所有部件之间有无接触状态发生？
有
重新排列主电路印刷电路板上的所有部件。
无
用手旋转主导轴马达时，有无异常声音发出？
有
更换主导轴马达。
无
检查传动系统的齿轮处有无发生故障现象。如有故障发生，换新之。
●带盘座
●带盘皮带轮组件
●离合器齿轮组件
●带盘惰轮组件

7 故障检修表

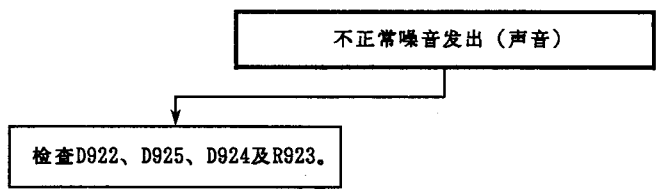
流程图 1　电源电路的故障检查(1)



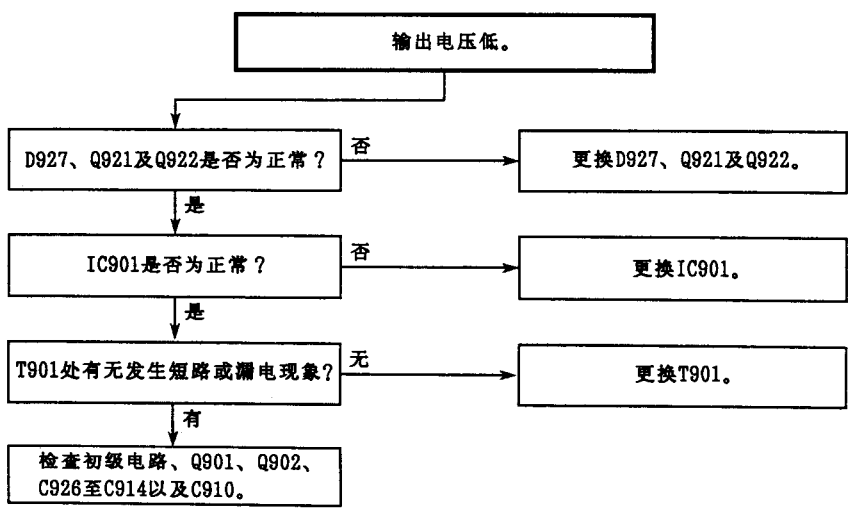
流程图2　电源电路的故障检修(2)



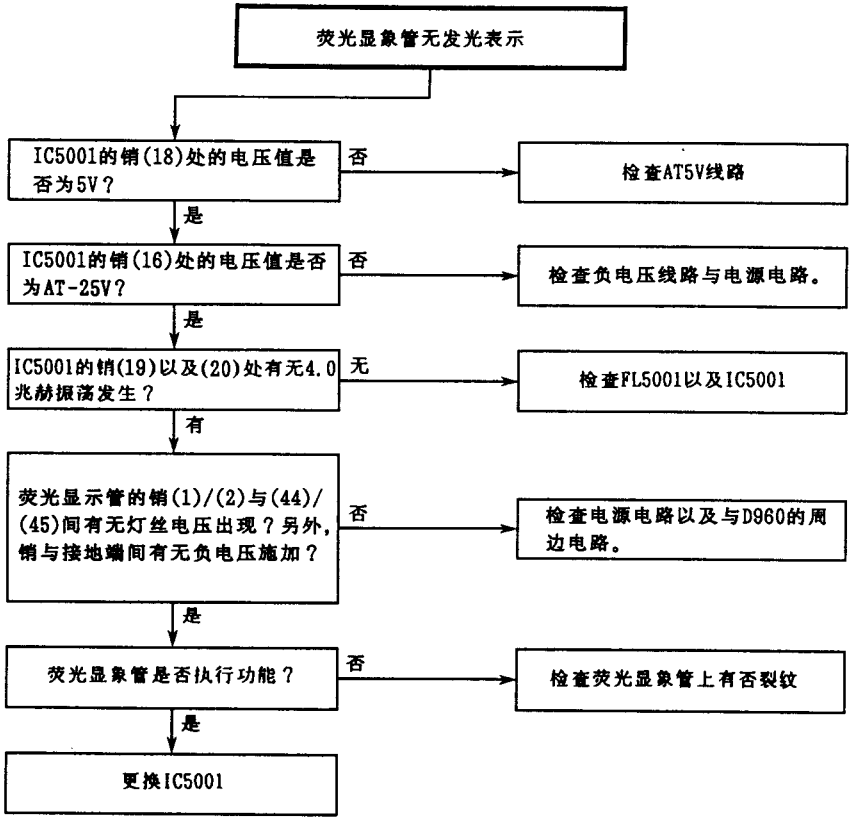
流程图3 电源电路的故障检修(3)



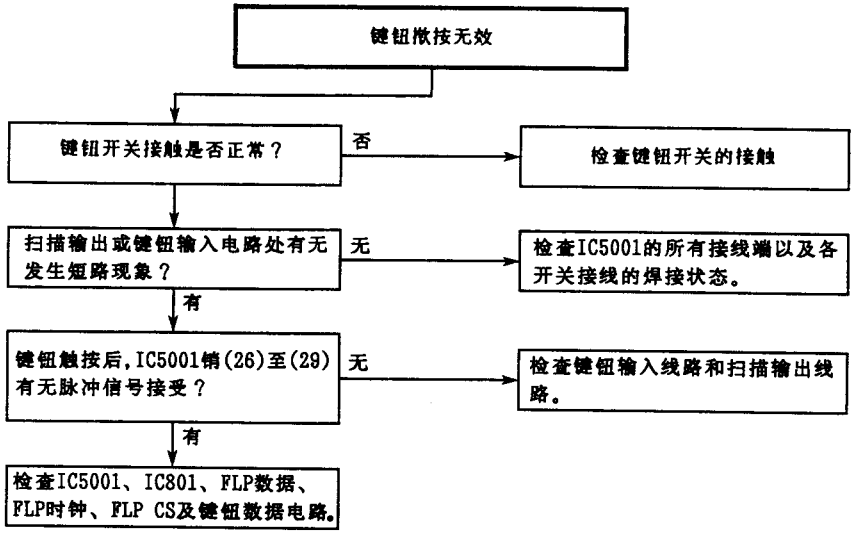
流程图4　电源电路的故障检修(4)



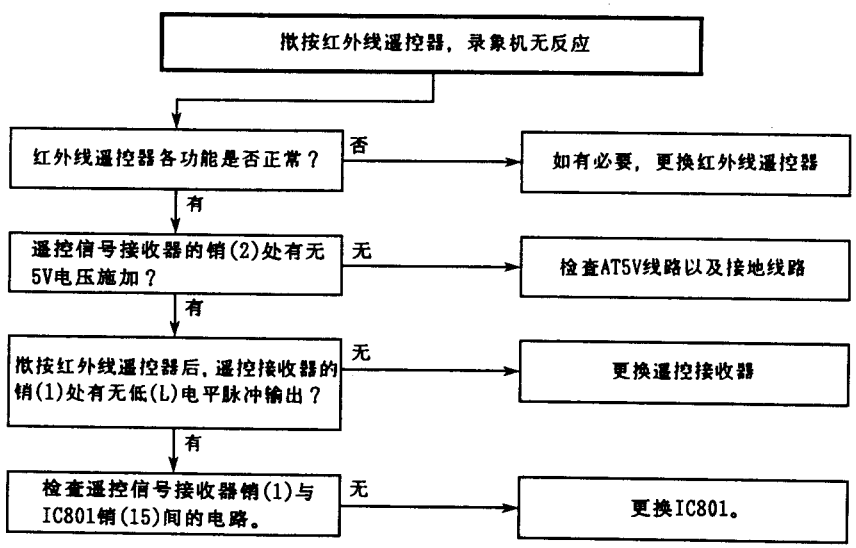
流程图 5　定时器(1)的故障检查



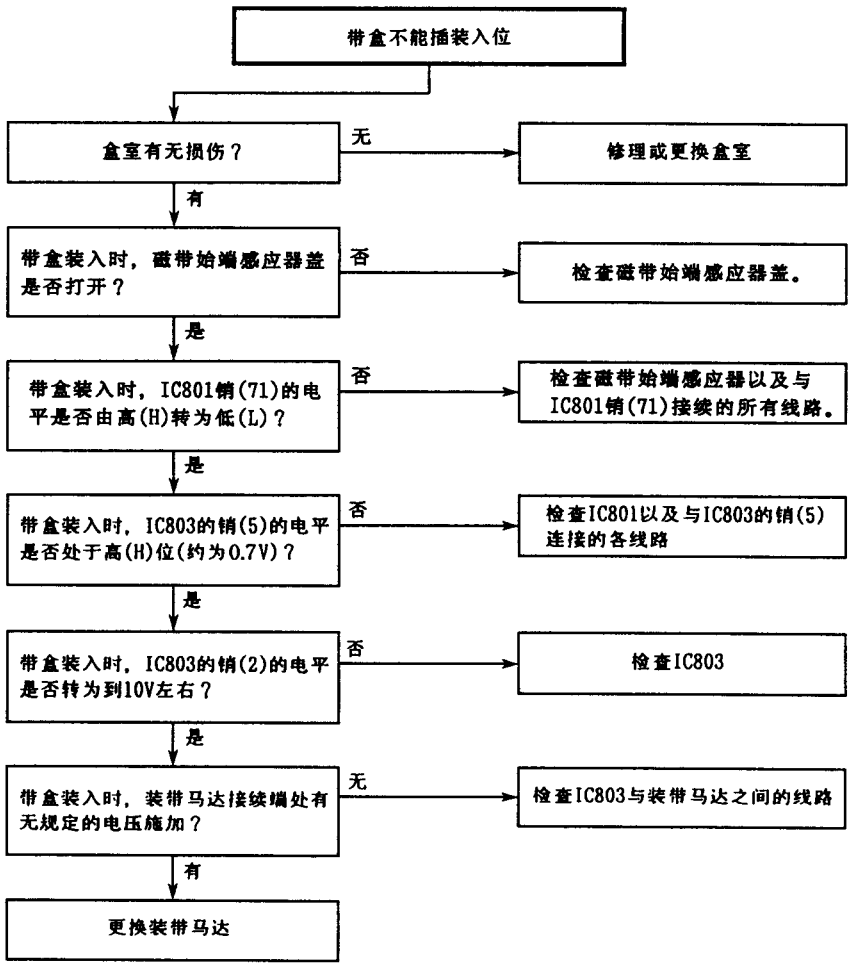
流程图 6　定时器(2)的故障检查



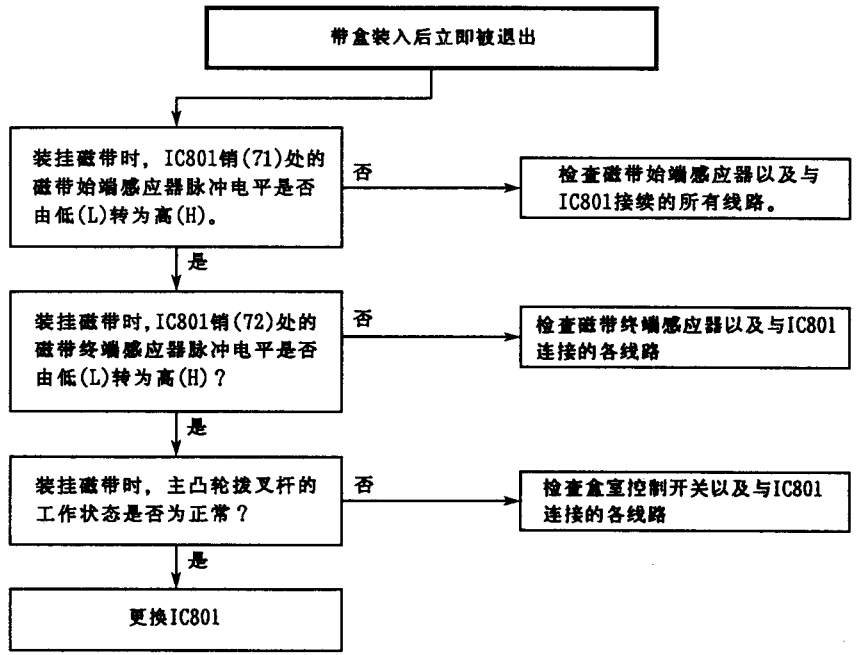
流程图 7　红外线遥控器的故障检查



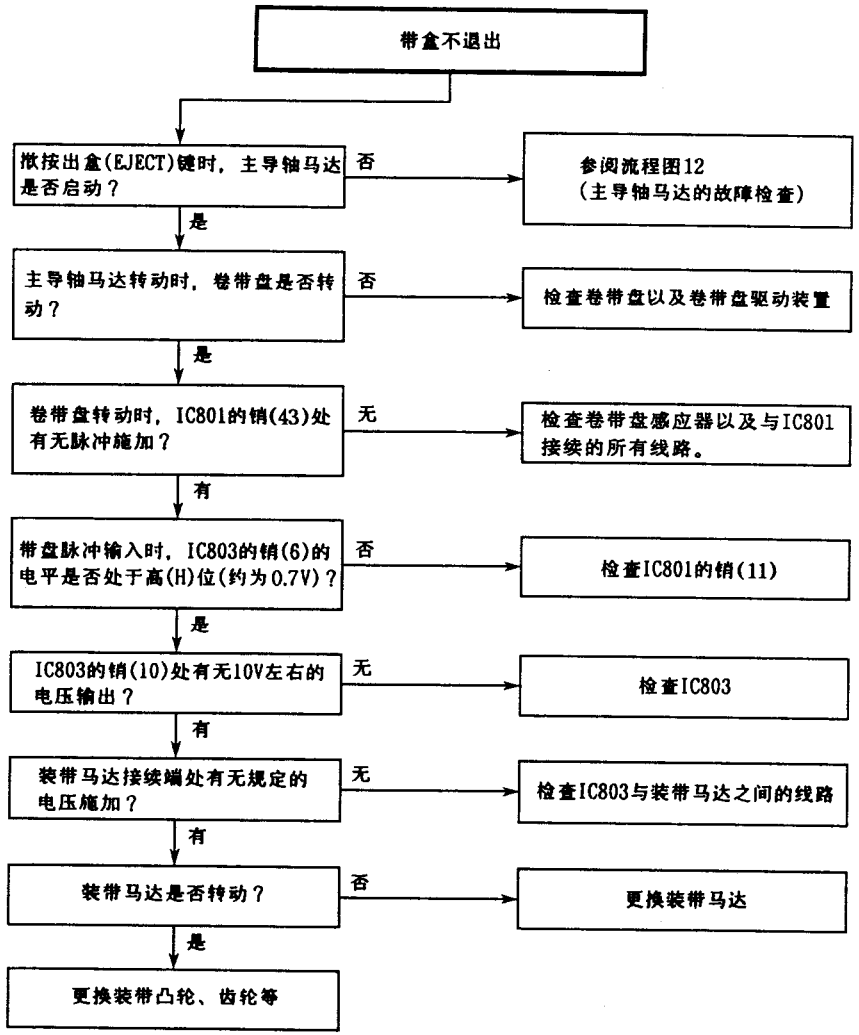
流程图 8　磁带盒室控制机构的故障检查（1）



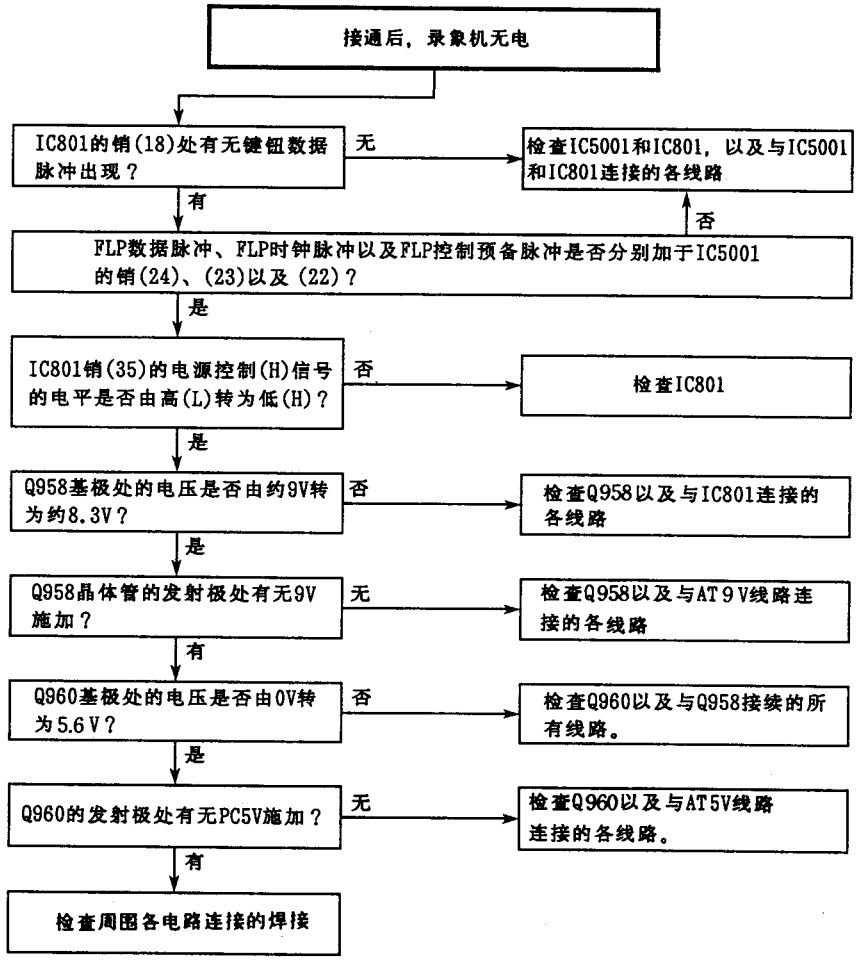
流程图 9　磁带盒室控制机构的故障检查（2）



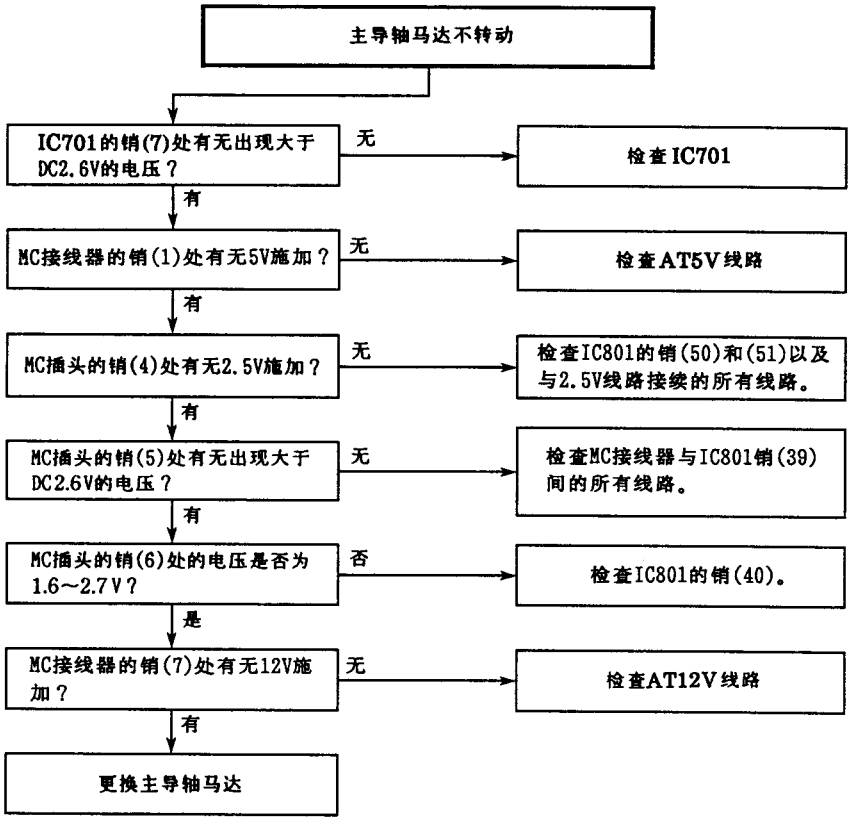
流程图10　装带马达以及出盒动作的故障检查



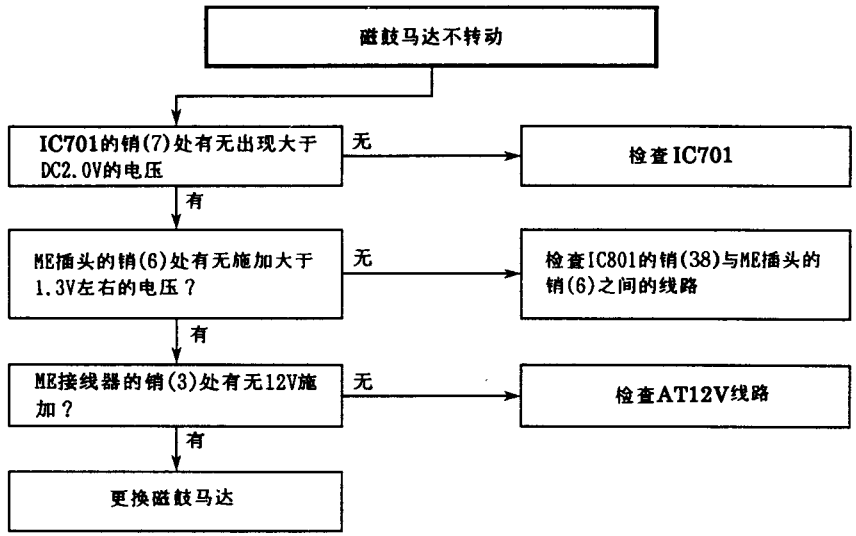
流程图11　系统控制电路的故障检查



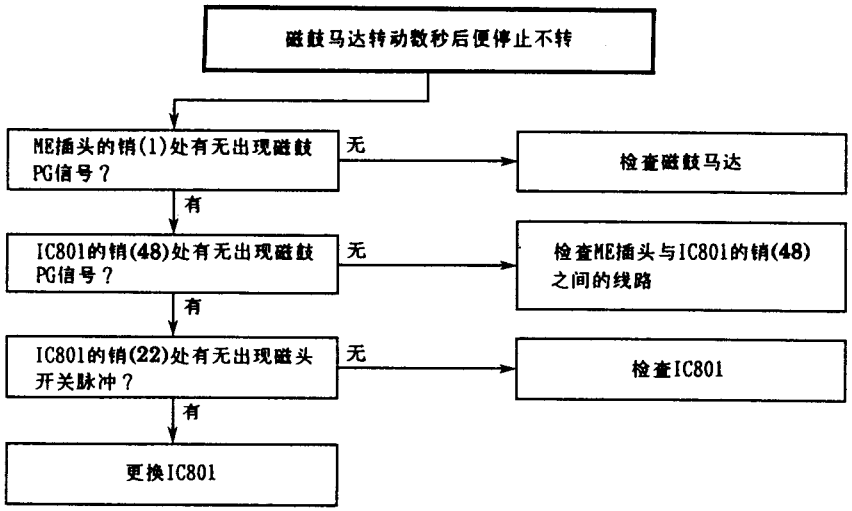
流程图12　主导轴马达的故障检查



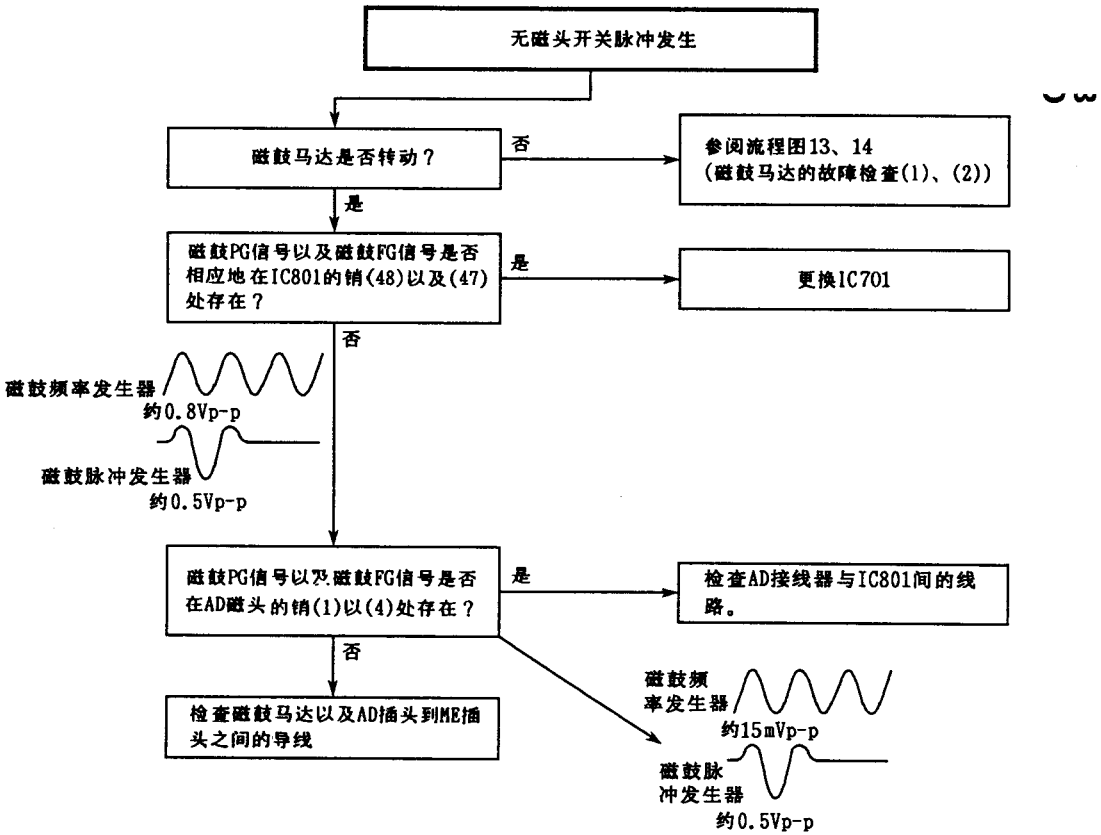
流程图13　磁鼓马达的故障检查（1）



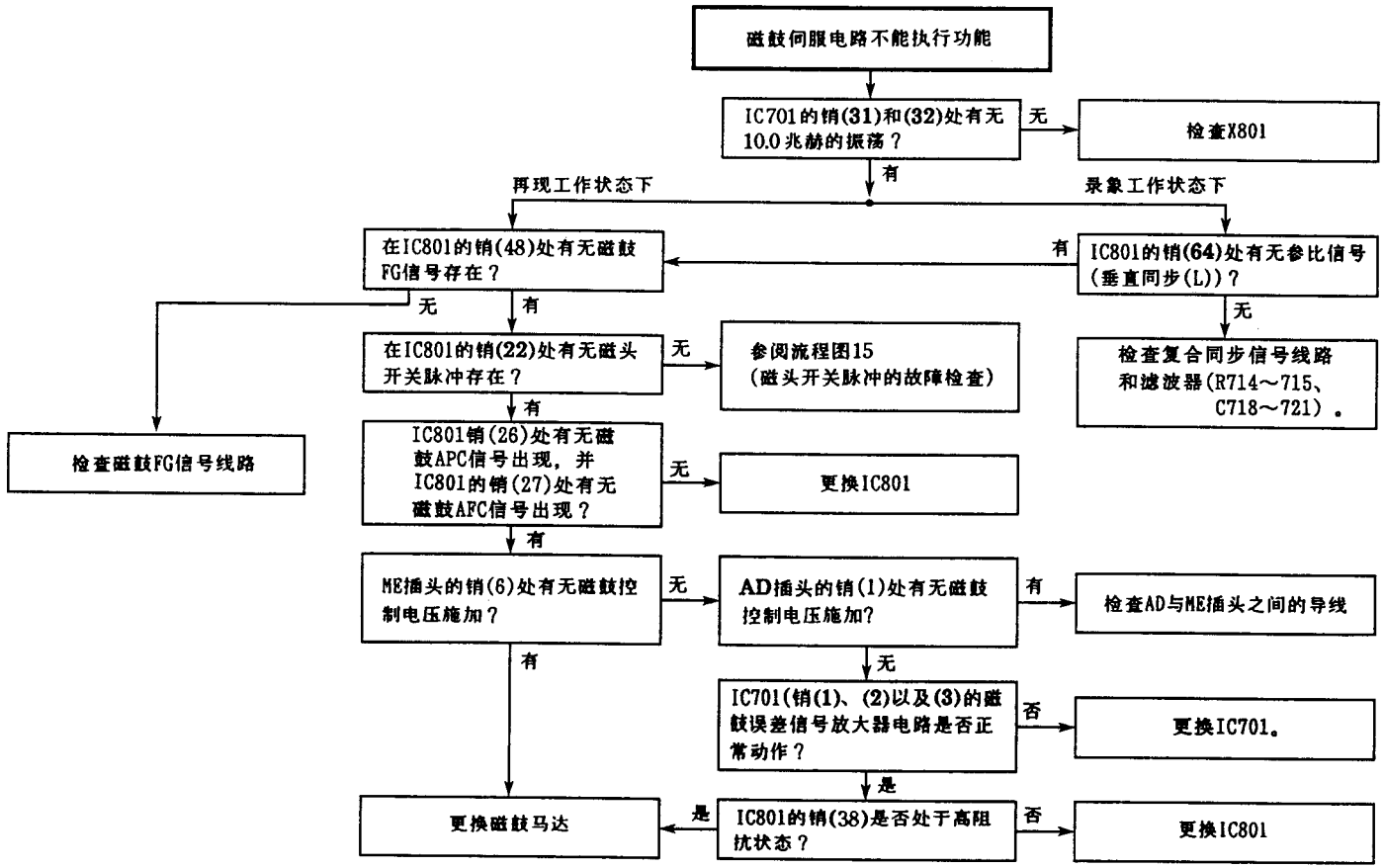
流程图14　磁鼓马达的故障检查(2)



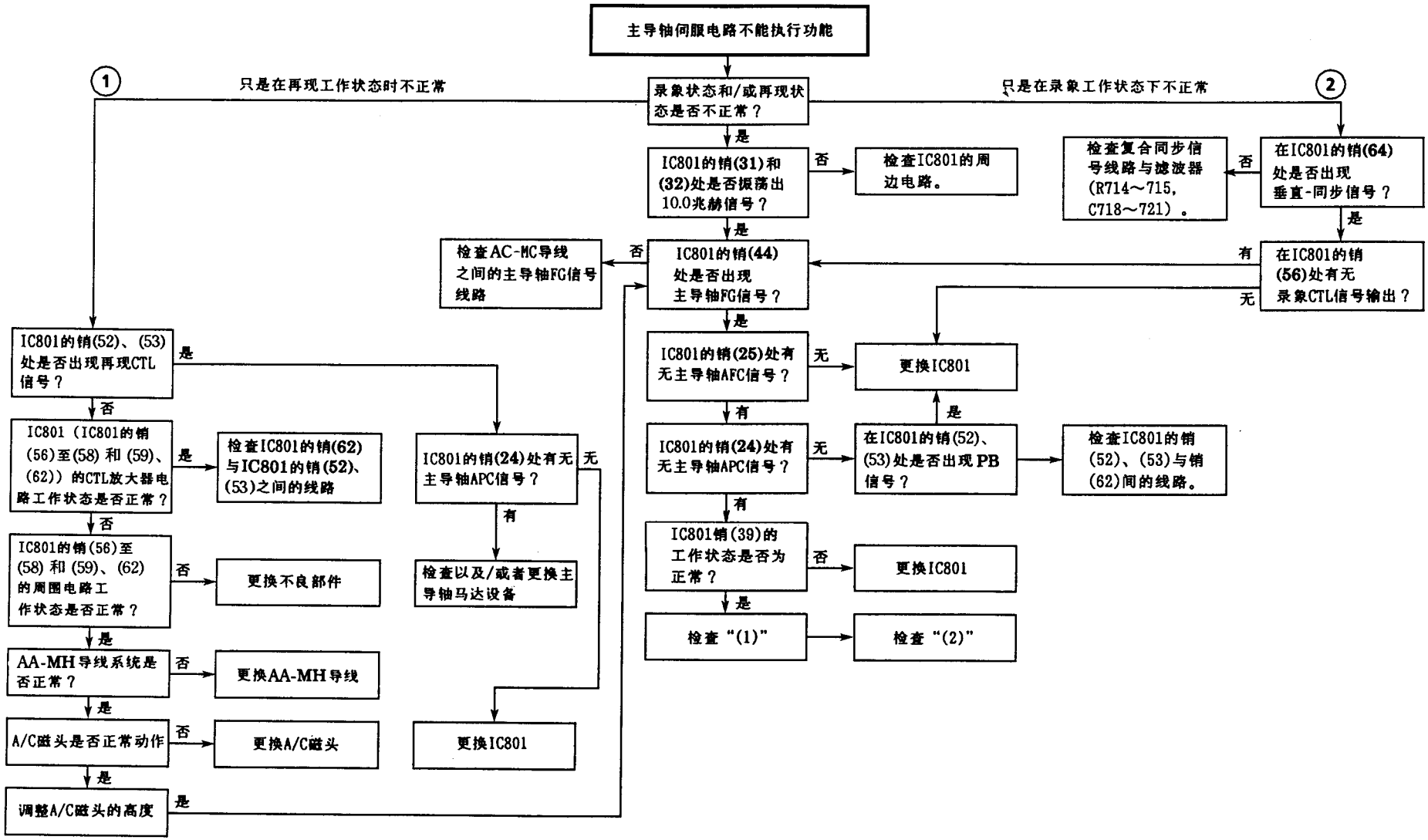
流程图15　磁头开关脉冲的故障检查



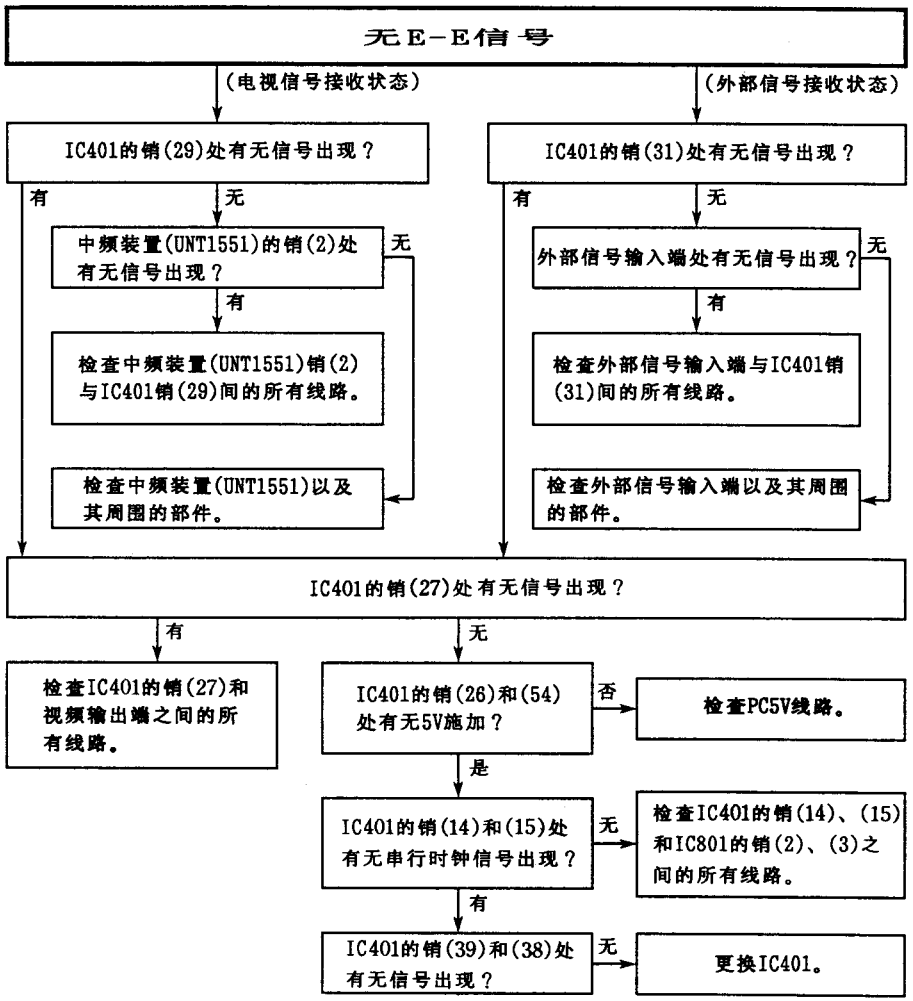
流程图16　磁鼓伺服电路的故障检查



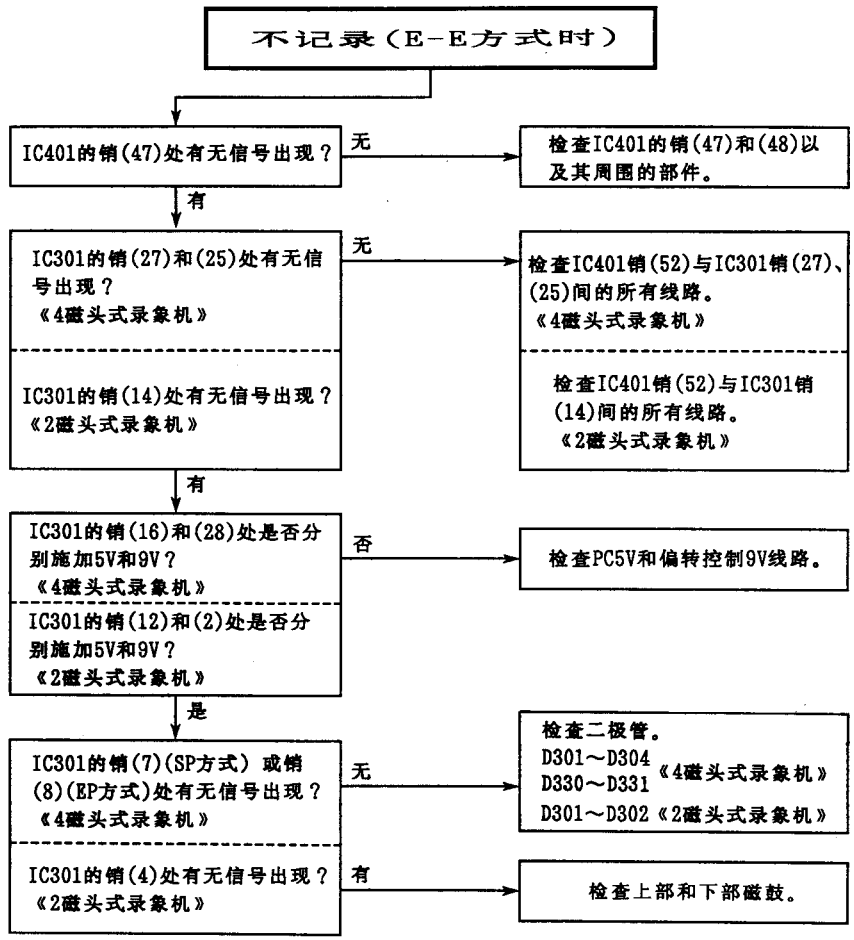
流程图17　主导轴伺服电路的故障检查



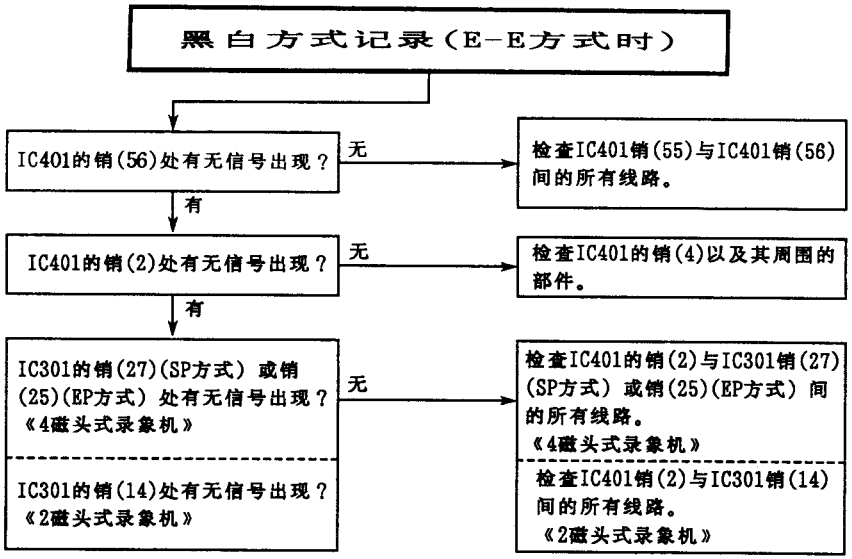
流程图18 E-E方式的故障检查



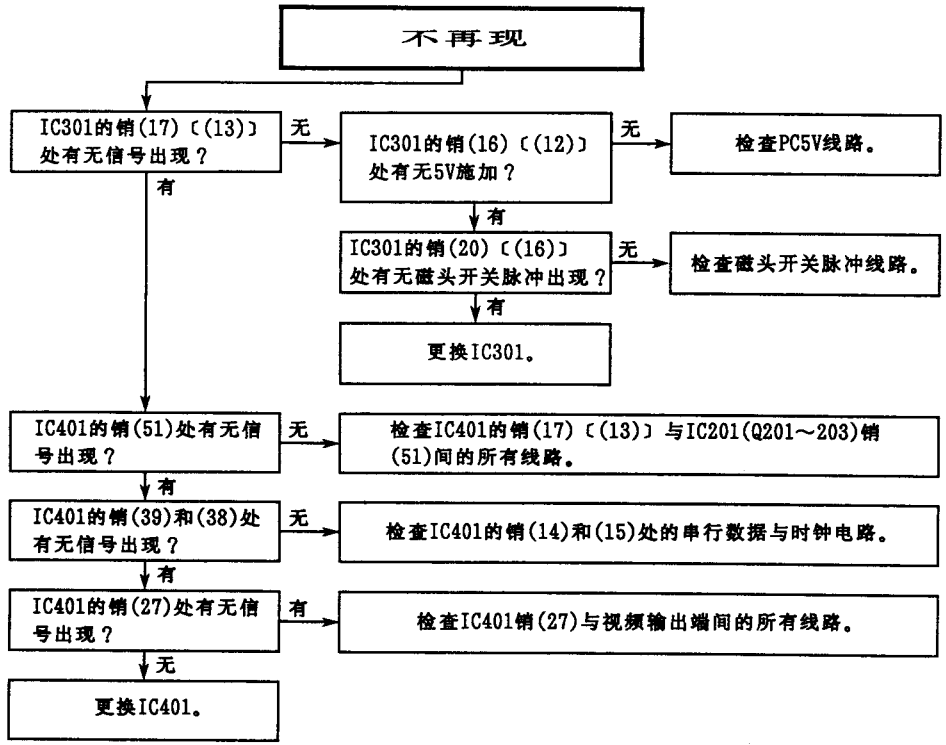
流程图19 记录状态(亮度)的故障检查



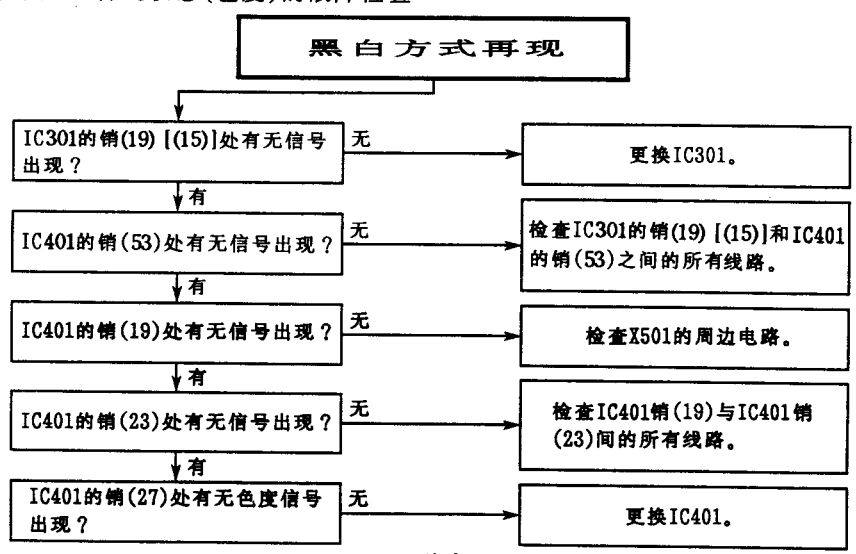
流程图20 记录状态(色度)的故障检查



流程图21 再现状态(亮度)的故障检查

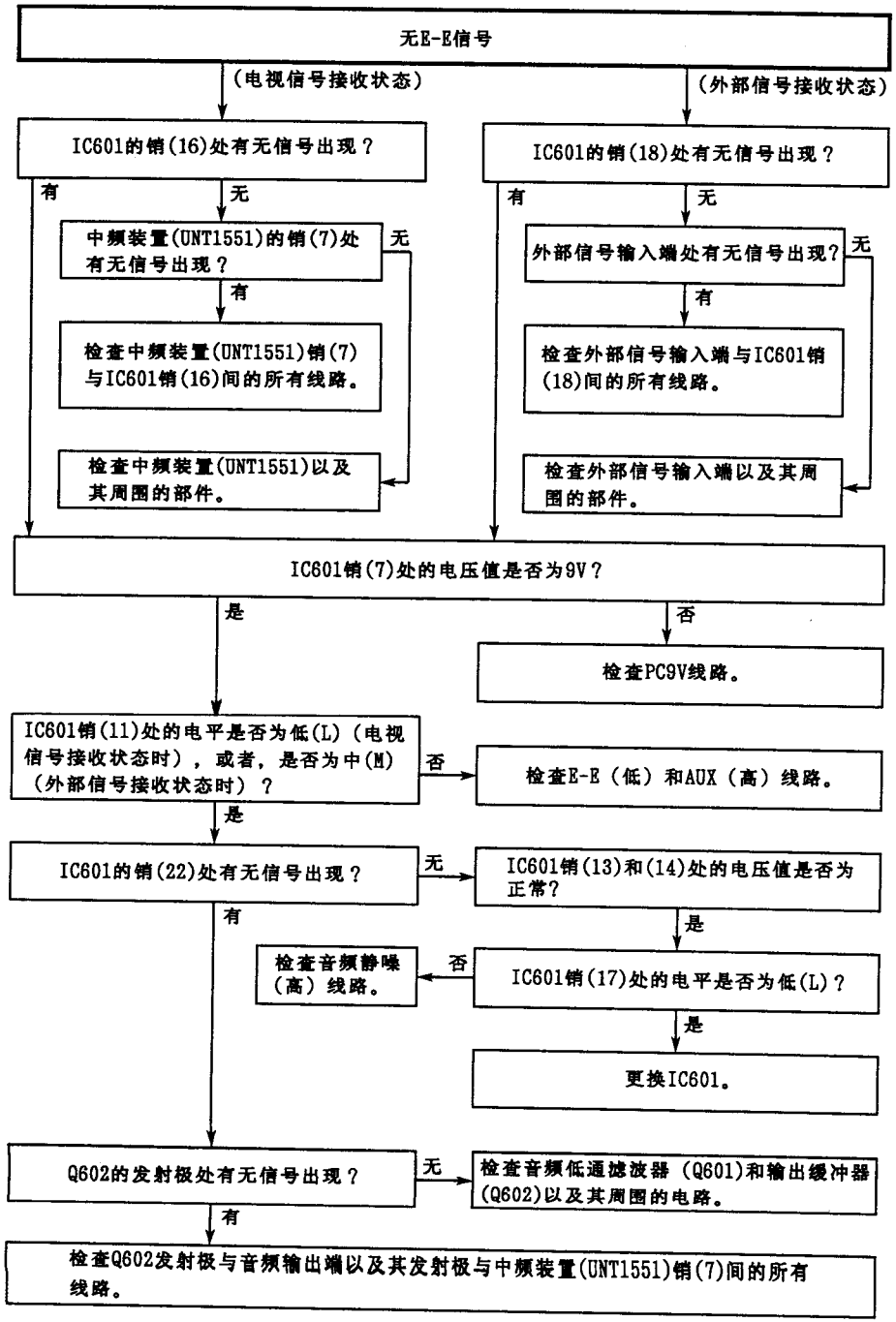


流程图22 再现状态(色度)的故障检查

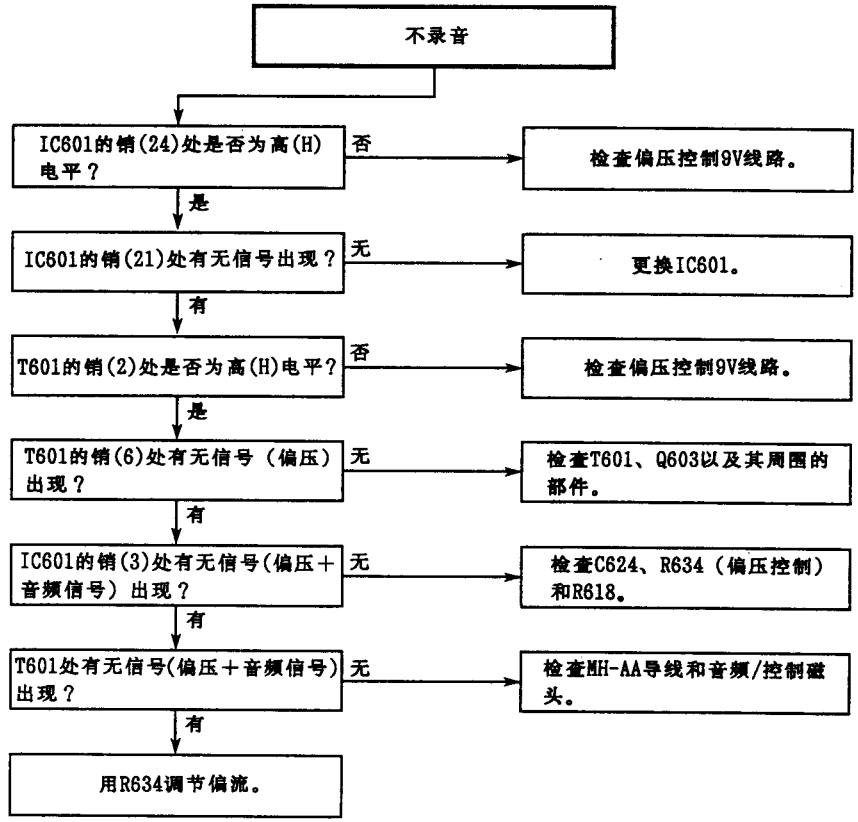


注意：〔 〕内的数值只适用于2磁头式录象机。

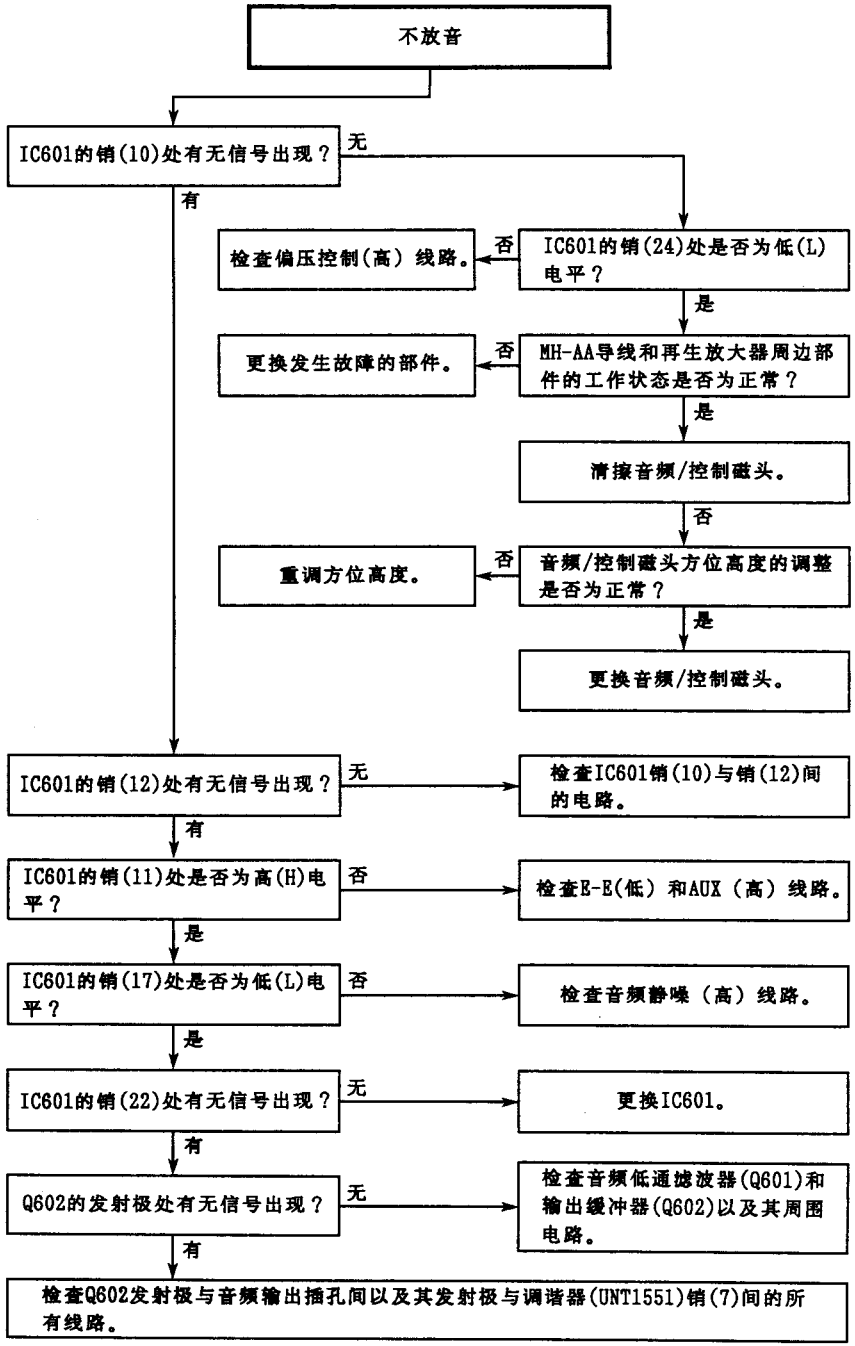
流程图23　线性录放音E-E方式的故障检修



流程图24　线性录音方式的故障检修



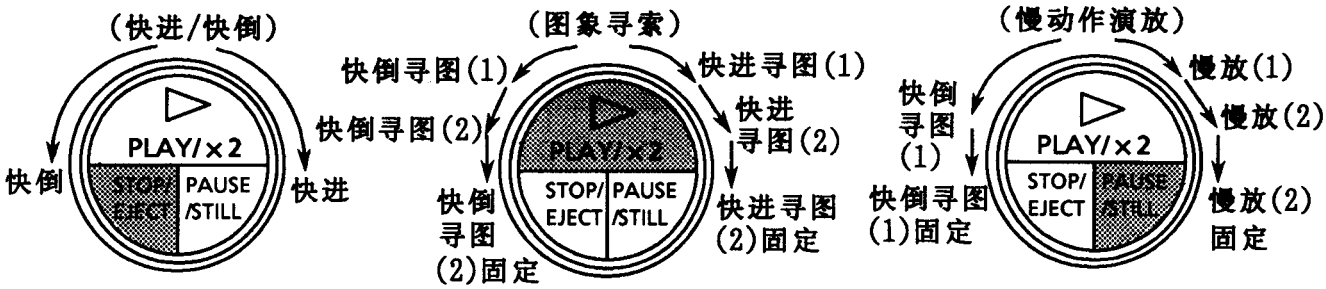
流程图25　线性放音方式的故障检修



快速走带控制系统的功能说明

1.动作说明

本快速走带控制系统之功用在于通过快速走带控制旋钮控制录象机走带的基本状态及其动作。



快进与快倒

(录象机体)

停止演放状态。顺时针或逆时针方向旋转走带控制旋钮，然后松放之（让其转回至中心位置）。这时录象机即被设定为快进或快倒状态。

(遥控器)

停止演放状态。触按快进(FF)或快倒(REW)键即可。

图象寻索

(录象机体)

演放状态中，顺时针或逆时针方向旋转走带控制旋钮，直至旋其于固定位置为止。这时录象机即被设定为快进寻图或快倒寻图的动作状态。

(遥控器)

演放状态中，触按快进(FF)或快倒(REW)键，录象机即被设定为快进寻图或快倒寻图的动作状态。每触按快进或快倒键一次，对应方向的寻图速度将按图所示的(2)→(1)→(2)的顺序变化。

走带速度

	快进/快倒寻图(1)	快进/快倒寻图(2)	慢放(1)	慢放(2)
PAL SP/LP方式	×3	×7	1/30	1/10
NTSC SP/LP方式	×3	×5	1/30	1/10
NTSC EP方式	×5	×15	1/30	1/10

可调慢动作演放

(录象机体)

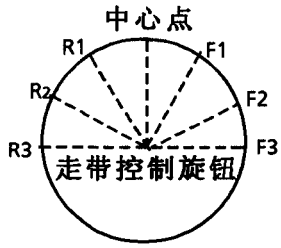
暂停状态中，顺时针旋转走带控制旋钮，并固定之。这时录象机即被设定为慢动作演放的动作状态。图象的慢放速度可根据旋钮的转角进行两极变化的调节。松放旋钮（让其转回至中心位置），录象机随即回到暂停状态。顺时针将旋钮转到底(90°)，慢放动作状态即被固定。

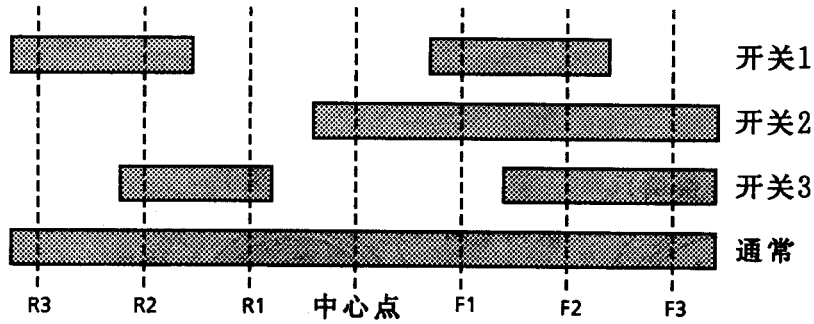
想由慢放固定状态回至常速演放或暂停状态时，触按演放(PB)或暂停（PAUSE)键即 可。暂停状态中，逆时针旋转走带控制旋钮，并固定之。这时录象机即被设定为快倒寻图的动作状态。松放旋钮，录象机随即回到暂停状态。逆时针将旋钮转到底(90°)，快倒寻图动作状态即被固定。

(遥控器)

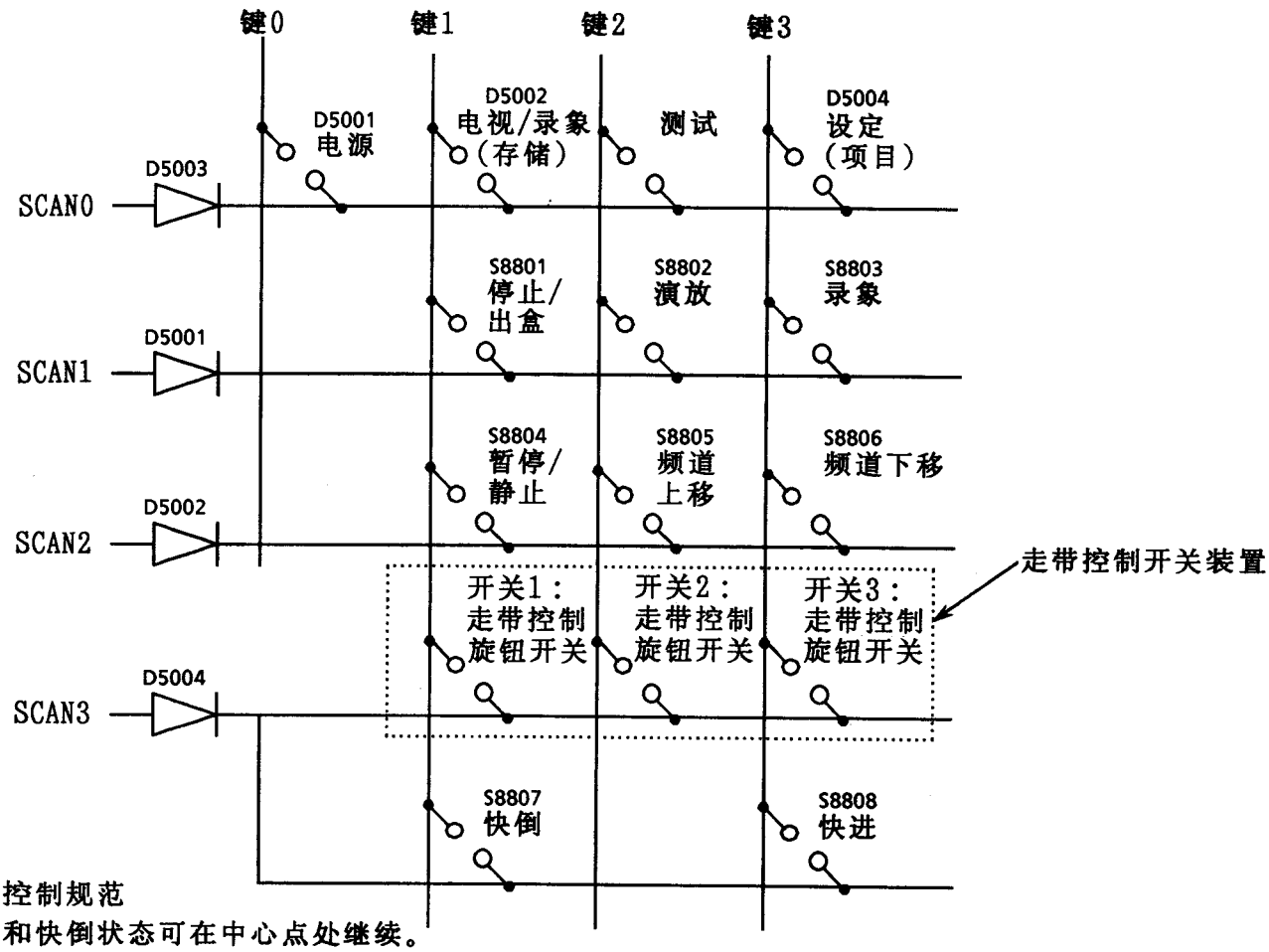
演放、暂停、快放或寻图状态中，触按慢放(SLOW)键，录象机便进入慢放动作状态。慢放速度可由慢放键的（+）和（—）进行1/10和1/30的两级变化的调节。慢放图象如有噪声线出现，用跟踪(TRACK)键的（+）和（—）将其调节至最小程度即可。慢放中，触按演放(PLAY/X2)键，录象机回至常速演放状态。

2. 走带控制旋钮对应的键功能矩阵





	R3	R2	R1	中心点	F1	F2	F3
开关1	1	1	0	0	1	1	0
开关2	0	0	0	1	1	1	1
开关3	0	1	0	0	0	1	1



3. 走带控制规范

1)快进和快倒状态可在中心点处继续。

2)寻图及慢放的速度设定如下：

	快进/快倒寻图(1)	快进/快倒寻图(2)	慢放(1)	慢放(2)
PAL SP/LP 方式	×3	×7	1/30	1/10
NTSC SP/LP 方式	×3	×5	1/30	1/10
NTSC EP 方式	×5	×15	1/30	1/10

※本走带控制旋钮不备顺时针、逆时针旋转到底时的锁扣功能。只要松放旋钮，旋钮随即返回至其中心点位置。

3)停止状态

初始位置	设定位置						
	R3	R2	R1	中心点	F1	F2	F3
F3（快进）	快倒	快倒	快倒	快进继续	快进	快进	—
F2（快进）	快倒	快倒	快倒	快进继续	快进	—	快进
F1（快进）	快倒	快倒	快倒	快进继续	—	快进	快进
中心点（停止）	快倒	快倒	快倒	—	快进	快进	快进
R1（快倒）	快倒	快倒	—	快倒继续	快进	快进	快进
R2（快倒）	快倒	—	快倒	快倒继续	快进	快进	快进
R3（快倒）	—	快倒	快倒	快倒继续	快进	快进	快进

4)演放状态

初始位置	设定位置						
	R3	R2	R1	中心点	F1	F2	F3
F3（快进寻图2）	快倒寻图2	快倒寻图2	快倒寻图1	快进寻图2继续	快进寻图2继续	快进寻图2继续	—
F2（快进寻图2）	快倒寻图2	快倒寻图2	快倒寻图1	演放继续	快进寻图1	—	快进寻图2
F1（快进寻图1）	快倒寻图2	快倒寻图2	快倒寻图1	演放继续	—	快进寻图2	快进寻图2
中心点（演放）	快倒寻图2	快倒寻图2	快倒寻图1	—	快进寻图1	快进寻图2	快进寻图2
R1（快倒寻图1）	快倒寻图2	快倒寻图2	—	演放继续	快进寻图1	快进寻图2	快进寻图2
R2（快倒寻图2）	快倒寻图2	—	快倒寻图1	演放继续	快进寻图1	快进寻图2	快进寻图2
R3（快倒寻图2）	—	快倒寻图2继续	快倒寻图2继续	快倒寻图2继续	快进寻图1	快进寻图2	快进寻图2

5)静止状态

初始位置	设定位置						
	R3	R2	R1	中心点	F1	F2	F3
F3（慢放2）	快倒寻图1	快倒寻图1	快倒寻图1	慢放2继续	慢放2继续	慢放2继续	—
F2（慢放2）	快倒寻图1	快倒寻图1	快倒寻图1	静止继续	慢放1	—	慢放2
F1（慢放1）	快倒寻图1	快倒寻图1	快倒寻图1	静止继续	—	慢放2	慢放2
中心点（图像静止）	快倒寻图1	快倒寻图1	快倒寻图1	—	慢放1	慢放2	慢放2
R1（快倒寻图1）	快倒寻图1	快倒寻图1	—	静止继续	慢放1	慢放2	慢放2
R2（快倒寻图2）	快倒寻图1	—	快倒寻图1	静止继续	慢放1	慢放2	慢放2
R3（快倒寻图2）	—	快倒寻图1继续	快倒寻图1继续	快倒寻图1继续	慢放1	慢放2	慢放2

※ 从F1或F2位置处松放旋钮时，录象机便随即返出至其初始状态(即演放或图象静止状态）。然而，转旋钮至F3位置处再松放之，让其转回中心点位置时，录象机将继续F3位置处锁定状态。

快进或快倒状态下，旋钮从F1、F2或F3位置处松放返回中心位置时，其状态均将继续。

定时器IC804(E PROM)的更换

〈更换时的注意事项〉

IC804(E^2 PROM)经更换后，请按下述步骤重新编写设定其记忆数据。

IC804(E^2 PROM)记忆数据的出厂设定，应录象机型号不同而异。因此，更换后必须对其功能记忆重新进行编写设定。

另外，更换后还必须设录象机于慢放和静止再现状态，重新对伺服电路进行调试。

功能记忆内容的编写设定

1. 检查电源开关是否处于切断状态。（电源开关处于备用状态）
2. 对主电路印刷电路板上的跨接销(33)和(34)进行瞬间短接处理。
   检查整个荧屏是否按要求点亮，并进入调试状态。
3. 触按频道移动(CHANNEL)键的（+）或（—），向荧屏上显示出的JP0～JP31的地址码中选定正确的功能数据，记忆于E PROM之中。
   设定方法：触按显示(DISPLAY)键以选定其功能(ON)，触按取消(CLEAR)键以取消其功能(OFF)。
   *触按显示(DISPLAY)键，功能记忆编码数闪现显示之。
   *触按取消(CLEAR)键，功能记忆编码数停止闪现。
4. 短接主电路印刷电路板上D5001阴极和跨接销(391)，荧屏上显示的设定内容改变十六进制显示。
   这样，可以方便地对设定内容的正误进行检查。

例如："ON"和"OFF"分别用数字"1"和"0"显示之。分JP0～JP31为8个组，每组的设定以十六进位制加以显示。

J31	J30	J29	J28	J27	J26	J25	J24	J23	J22	J21	J20	J19	J18	J17	J16
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇩				⇩				⇩				⇩		
	空白				0				0				0		

J15	J14	J13	J12	J11	J10	J9	J8	J7	J6	J5	J4	J3	J2	J1	J0
0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	1
	⇩				⇩				⇩				⇩		
	0				4				0				D		

上述8位的十六进制数值"000040D"显示于荧屏。

5. 最后，再对主电路印刷电路板上跨接销(33) 和(34)进行瞬间短接处理，取消调试状态的设定，或者，触按执行键，打开录象机电源。

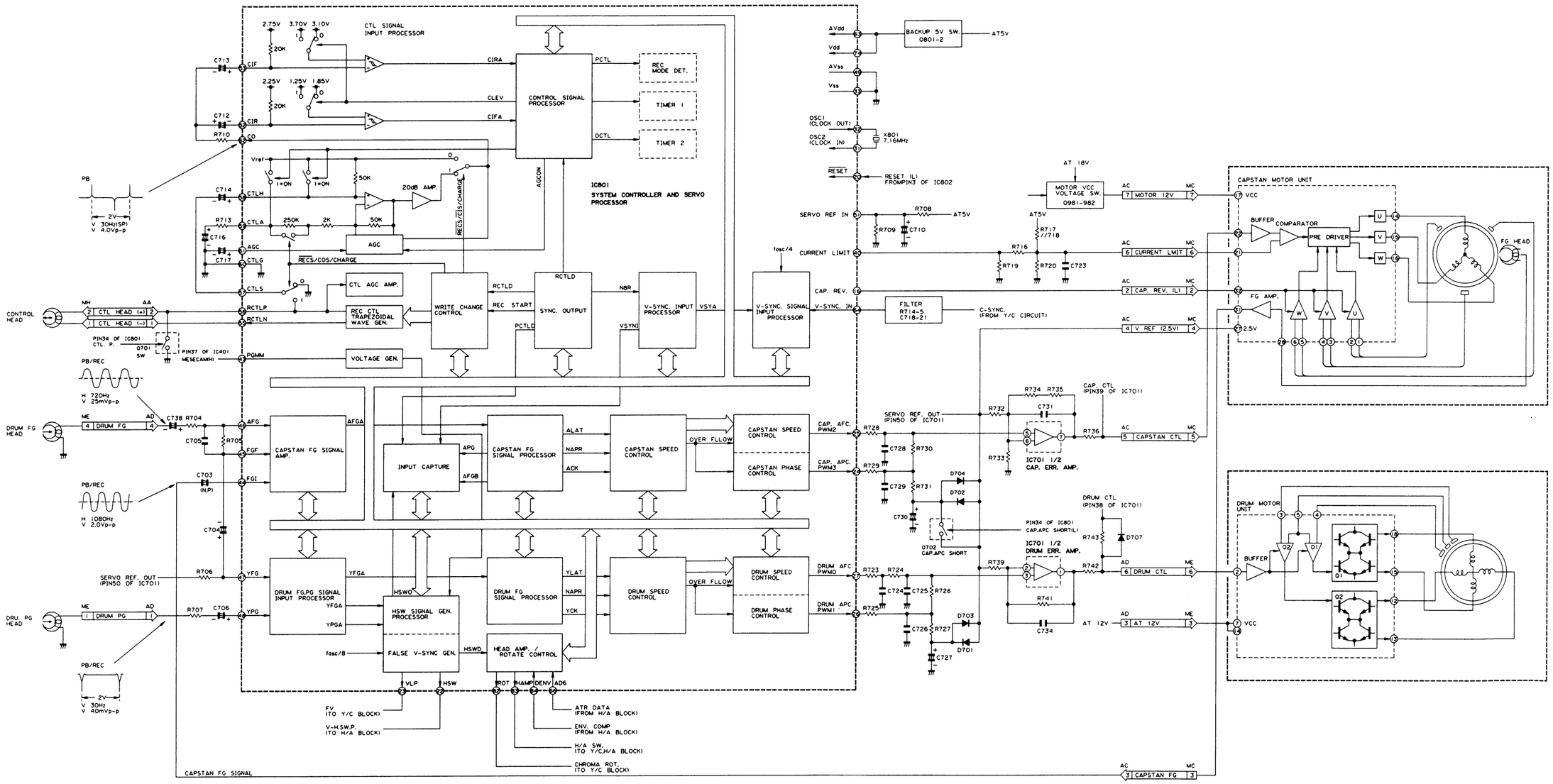
		MY2/B	MA30B VR135 MA30SA MA20B	MA30D	A36X	A36NZ	MA40B	MA48D	A62X	A41X	A42NZ	A50X	A72X	A72NZ		
JP31	---	0	0	0	0	0	0	0	0	0	0	0	0	0		
30	---	0	0	0	0	0	0	0	0	0	0	0	0	0		
29	---	0	0	0	0	0	0	0	0	0	0	0	0	0		
28	---	0	0	0	0	0	0	0	0	0	0	0	0	0		
27	NT-PB	0	1	1	0	0	1	1	0	1	0	0	0	0		
26	---	0	0	0	0	0	0	0	0	0	0	0	0	0		
25	HEAD1	0	0	0	0	0	1	1	1	0	0	0	1	1		
24	HEAD0	1	0	0	0	0	0	0	0	0	0	1	0	0		
23	---	0	0	0	0	0	0	0	0	0	0	0	0	0		
22	---	0	0	0	0	0	0	0	0	0	0	0	0	0		
21	---	0	0	0	0	0	0	0	0	0	0	0	0	0		
20	---	0	0	0	0	0	0	0	0	0	0	0	0	0		
19	Hi-Fi	0	0	0	0	0	0	0	0	0	0	0	0	0		
18	NICAM	0	0	0	0	0	0	0	0	0	0	0	0	0		
17	G-CODE1	1	0	0	0	0	0	0	0	0	0	0	0	0		
16	G-CODE0	1	0	0	0	0	0	0	0	0	1	0	1	1		
15	OEM	1	1	1	0	0	1	1	0	0	0	0	0	0		
14	LP	1	0	0	0	0	1	1	1	0	0	1	1	1		
13	---	0	0	0	0	0	0	0	0	0	0	0	0	0		
12	SHUTTLE	0	0	0	0	0	1	1	1	0	0	0	1	1		
11	LINE2	0	0	0	0	0	0	0	0	0	0	0	1	1		
10	CATV	0	0	0	0	0	0	0	0	0	0	0	0	0		
9	TUNER1	1	0	0	0	0	0	0	0	0	0	0	0	0		
8	TUNER0	1	0	0	0	0	0	0	0	0	0	0	1	0		
7	DECODER	1	0	0	0	0	0	0	0	0	0	0	0	0		
6	SYSTEM-I	0	0	1	0	0	0	1	0	0	0	0	0	0		
5	VCR1	1	0	0	0	0	0	0	0	0	0	0	0	0		
4	VCR0	0	0	0	0	1	0	0	0	0	1	0	0	1		
3	PDC	0	0	0	0	0	0	0	0	0	0	0	0	0		
2	VPS	0	0	0	0	0	0	0	0	0	0	0	0	0		
1	COLOUR1	0	1	1	0	0	1	1	0	0	0	0	0	0		
0	COLOUR0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		103C3A0	8008002	8008042	0000000	0000010	A00D002	A00D042	2005000	8000000	0010010	1004000	2015900	2015810		

（注：“1”闪现，“0”不闪现。）

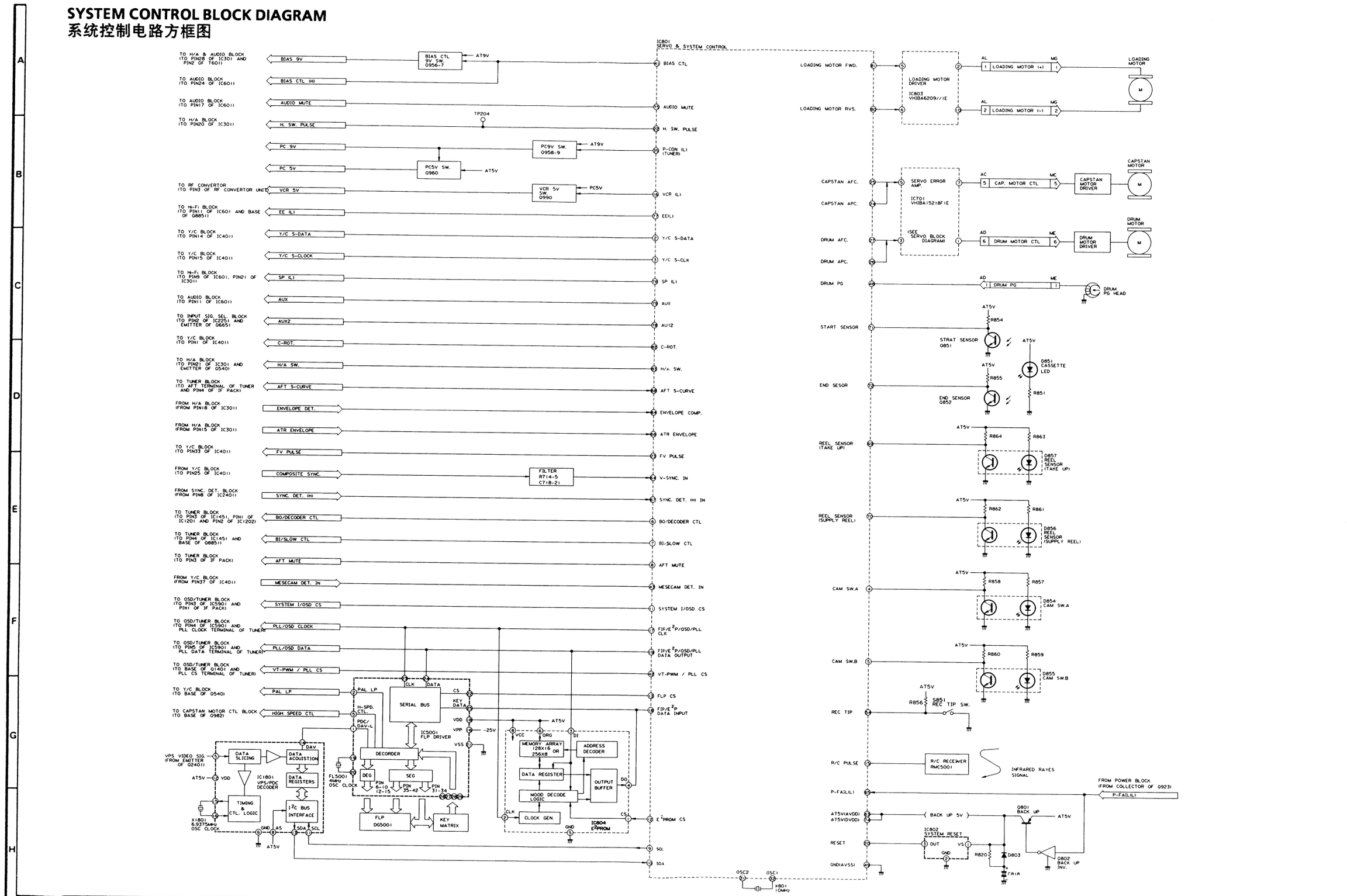
MEMO

8. BLOCK DIAGRAM 方框图

SERVO PROCESS BLOCK DIAGRAM 伺服电路方框图



SYSTEM CONTROL BLOCK DIAGRAM
系统控制电路方框图



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SIGNAL FLOW BLOCK DIAGRAM
信号流程方框图

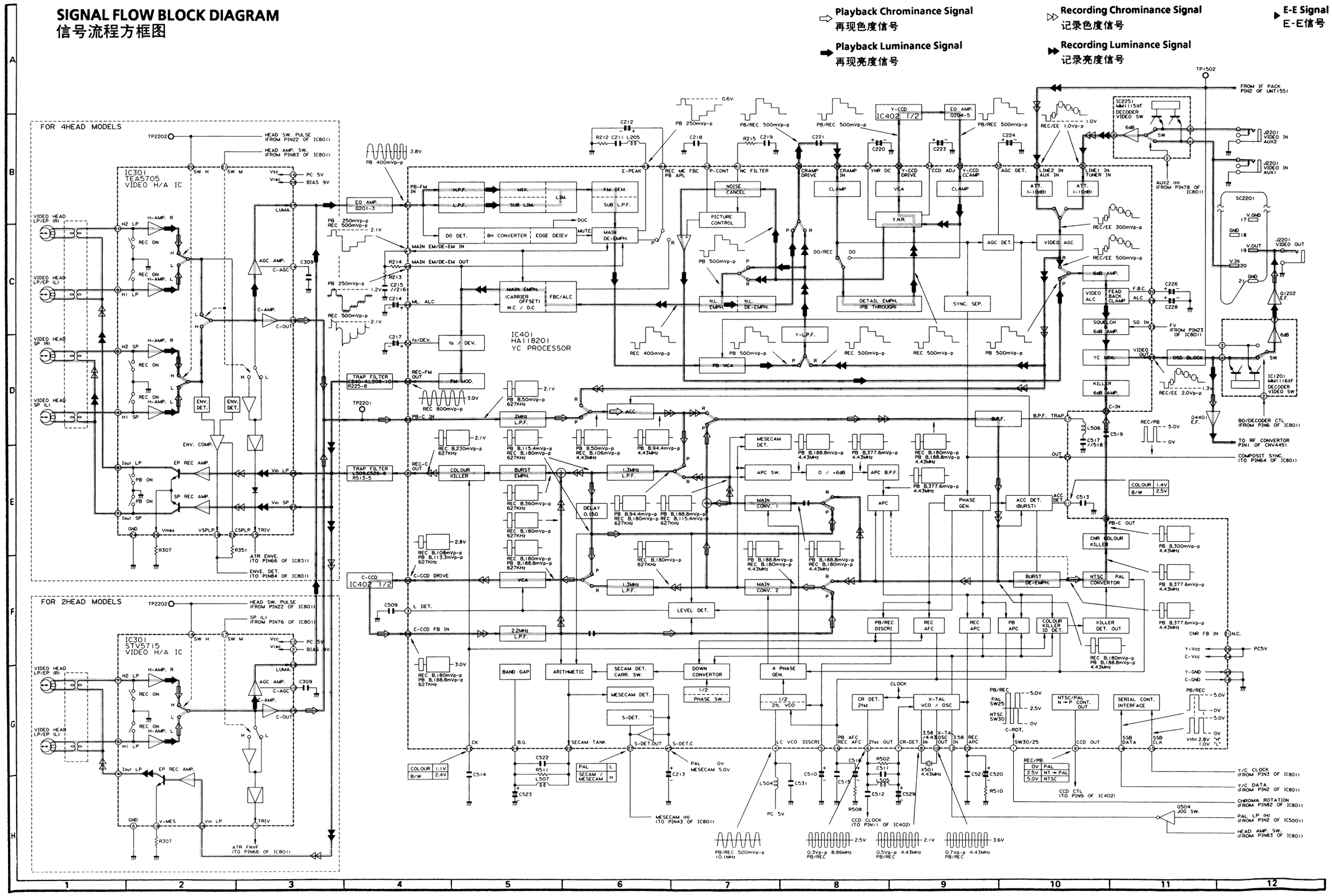
Playback Chrominance Signal 再现色度信号

Playback Luminance Signal 再现亮度信号

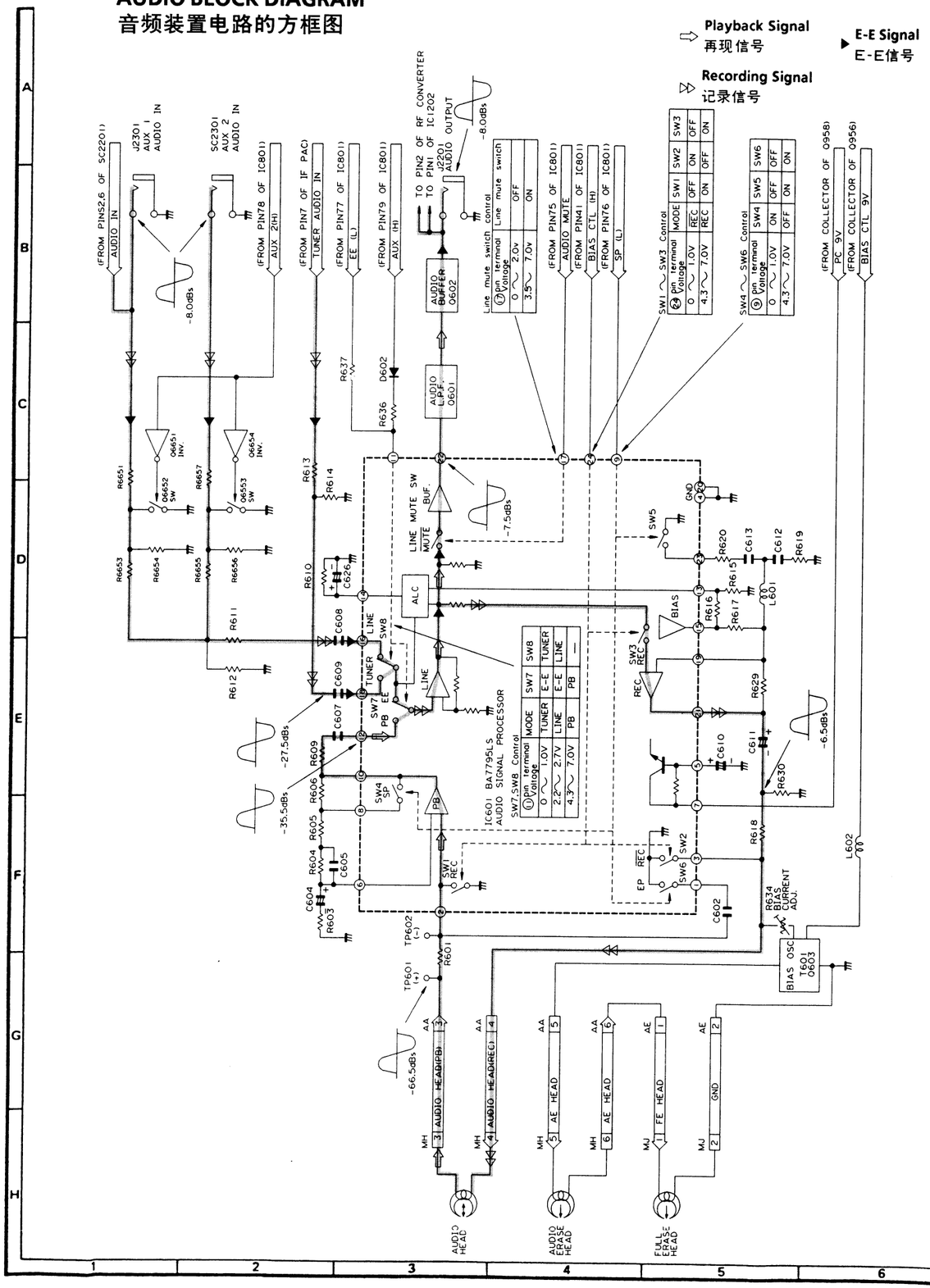
Recording Chrominance Signal 记录色度信号

Recording Luminance Signal 记录亮度信号

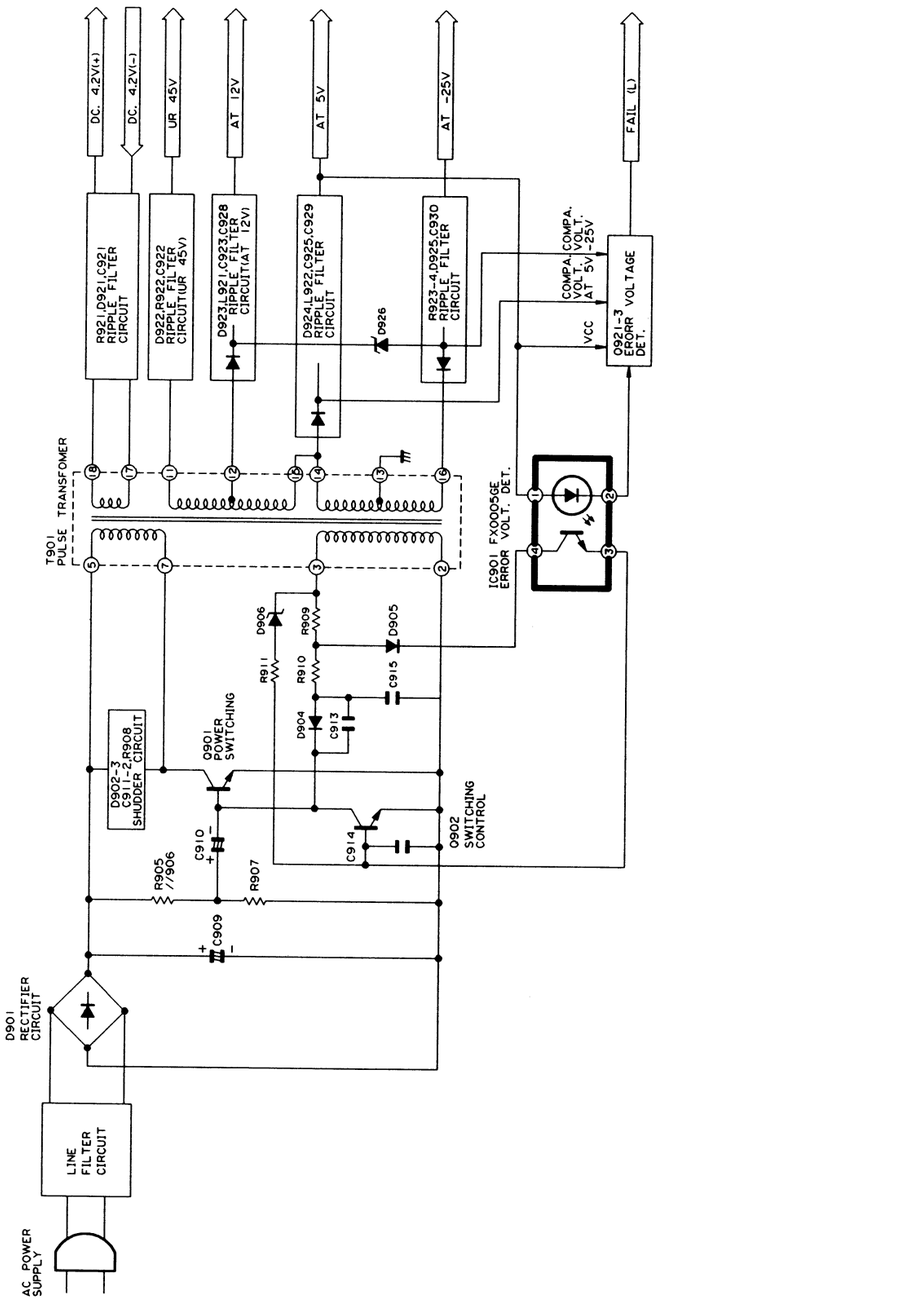
E-E Signal E-E信号



AUDIO BLOCK DIAGRAM
音频装置电路的方框图



POWER CIRCUIT BLOCK DIAGRAM
电源电路方框图



MEMO

SCHEMATIC DIAGRAM

IMPORTANT SAFETY NOTICE:
BE SURE TO USE GENUINE PARTS FOR SECURING THE SAFETY AND RELIABILITY OF THE SET. PARTS MARKED WITH "⚠" AND PARTS SHADED (IN BLACK) ARE ESPECIALLY IMPORTANT FOR MAINTAINING THE SAFETY AND PROTECTING ABILITY OF THE SET.
BE SURE TO REPLACE THEM WITH PARTS OF SPECIFIED PART NUMBER.

SAFETY NOTES:
1. *DISCONNECT THE AC PLUG FROM THE AC OUTLET BEFORE REPLACING PARTS.*
2. *SEMICONDUCTOR HEAT SINKS SHOULD BE REGARDED AS POTENTIAL SHOCK HAZARDS WHEN THE CHASSIS IS OPERATING.*

NOTES:
1. *The unit of resistance "ohm" is omitted (k = 1000 ohm, M = 1 Meg ohm).*
2. *All resistors are 1/8 watt, unless otherwise noted.*
3. *The unit of capacitance "F" is omitted (μ = μF, p = μμF).*
4. *The values in parentheses are the ones in the PB mode; the values without parentheses are the ones in the REC mode.*

VOLTAGE MEASUREMENT CONDITIONS:
1. *DC voltages are measured between points indicated and chassis ground by VTVM, with AC220V,50/60Hz supplied to unit and all controls are set to normal viewing picture unless otherwise noted.*
2. *Voltages are measured with 10000μV B & W or colour signal.*

WAVEFORM MEASUREMENT CONDITIONS:
10000μV 87.5 percent modulated colour bar signal is fed into tuner.

CAUTION:
This circuit diagram is original one. Therefore there may be a slight difference from yours.

电路原理图

安全使用注意要点：

为了保证本装置的安全性及可靠性，务请使用该型号装置的原配零件。

注有⚠标记，以及打有黑色阴影线的部分，对于保护本装置的安全、保持其使用性能及使用寿命极其重要。

更换这些部件时，务请使用规定编号者。

安全使用注意事项：

1. 在进行部件更换之前，务请拔出电源插头。
2. 本装置工作时，机芯底盘的半导体散热片有触电之虑，务请注意。

电路单位说明：

1. 电阻"欧姆"（Ω）单位予以略记（K＝千欧，M＝兆欧姆）。
2. 除特别说明者外，图中电阻功率均为1/8瓦特。
3. 电容"法拉"（F）单位予以略记（μ＝微法拉，P＝微微法拉）。
4. 在括弧内的数值为PB状态，无括弧的数值为REC状态。

电压测定条件

1. 除特别说明者外，直流电压是以AC220V，50/60Hz交流电源供给本装置时，将所有控制调节都调至正常状态后，把VTVM（电子管电压表）连接于测点与底盘接地之间所得的读数。
2. 电压由10000μV黑白或彩色信号测定。

波形测定条件：

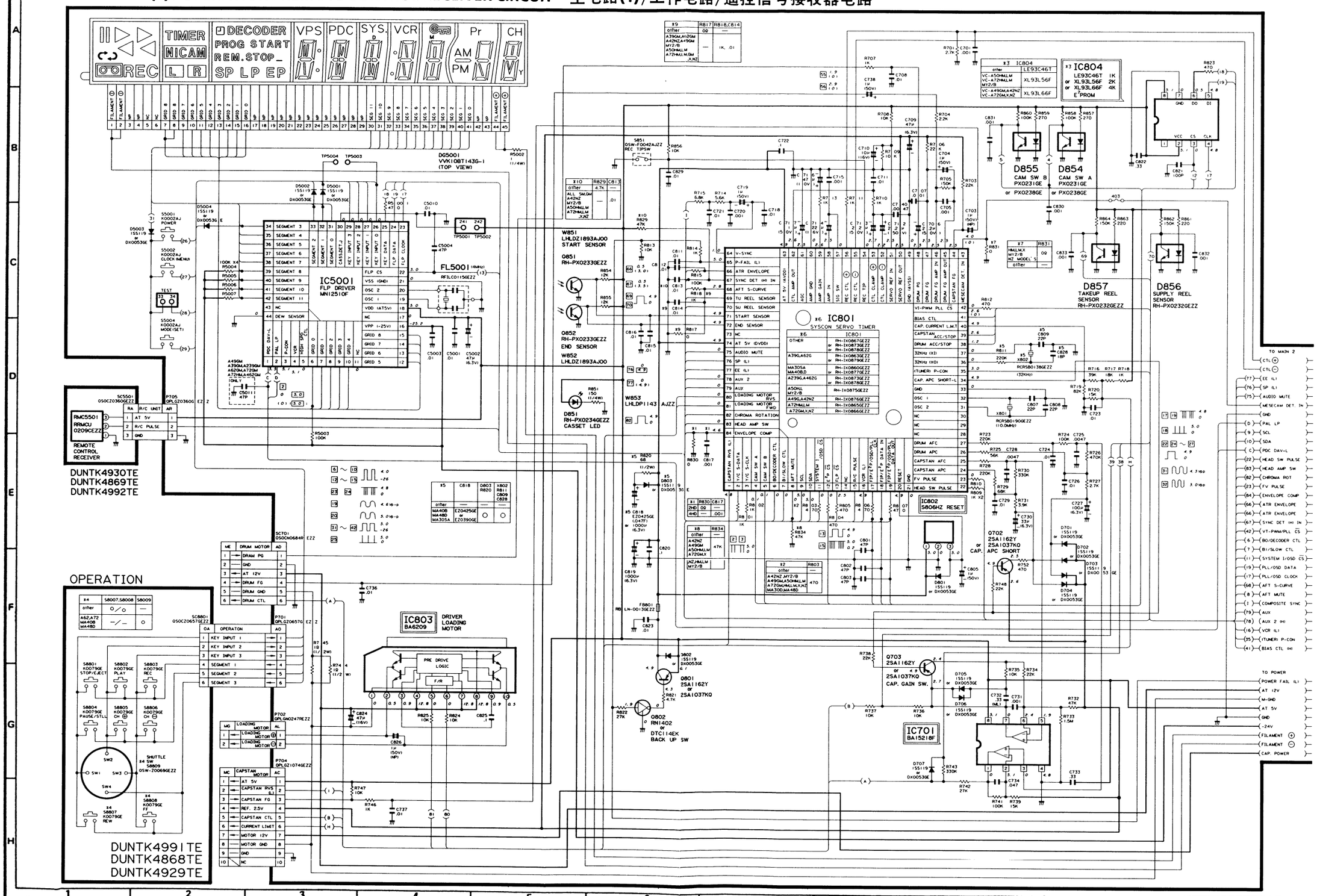
向调谐器输入10000μV的87.5%调制色带信号的状态时进行测量。

注意：

这里的电路原理图均为最初设计原图，与您的机器的电路原理图可能有不同之处。

9. CIRCUIT DIAGRAM AND PWB FOIL PATTERN 电路方框图与印刷电路板图案

MAIN (1) / OPERATION / REMOTE CONTROL RECEIVER CIRCUIT 主电路(1)/工作电路/遥控信号接收器电路

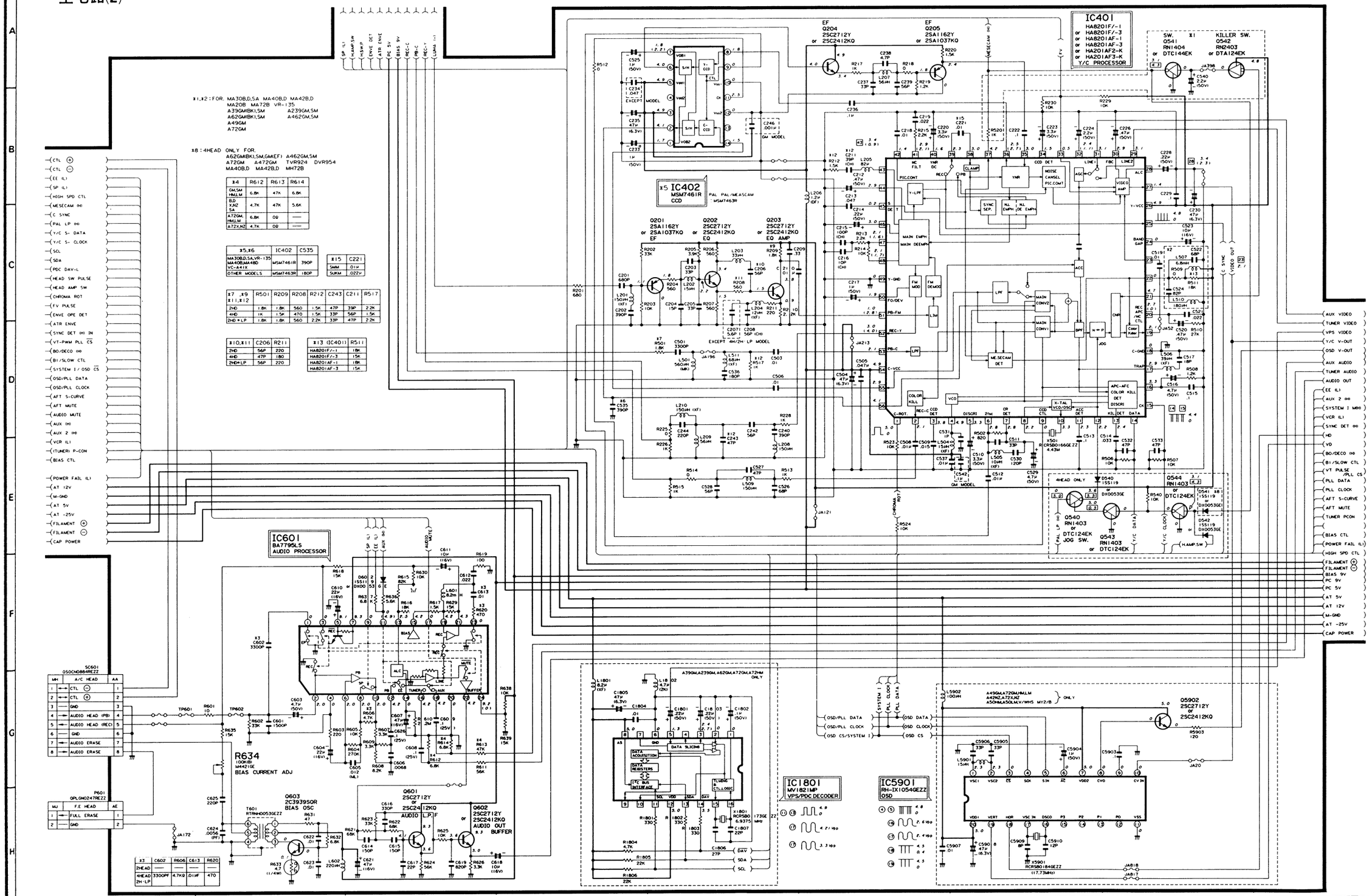


* VOLTAGE MEASUREMENT MODE ● 电压测量数值

PB ..... Parentheses ( ) 再现：括弧内的数值

REC ..... Without Parentheses 记录：无括弧的数值

MAIN CIRCUIT (2)
主电路(2)



A4	R612	R613	R614
GM,SM HM,LM	6.8K	47K	6.8K
B,D XJKZ SA	4.7K	47K	5.6K
A72GM, HM,LM	6.8K	0Ω	—
A72XJKZ	4.7K	0Ω	—

A5,A6	IC402	C535
MA30B,D,SA,VR-135 MA40B,MA48D VC-A41X	MSM7461R	390P
OTHER MODELS	MSM7463R	180P

A15	C221
SMM	.01μ
SUKM	.022μ

A7 ,A9 A11,A12	R501	R209	R208	R212	C243	C211	R517
2HD	1.8K	1.8K	560	1.5K	47P	39P	2.2K
4HD	1K	1.5K	470	1.5K	33P	56P	1.5K
2HD + LP	1.8K	1.8K	560	2.2K	33P	47P	2.2K

A10,A11	C206	R211
2HD	56P	220
4HD	47P	180
2HD+LP	56P	220

A13 (IC401)	R511
HA8201F/-1	18K
HA8201F/-3	15K
HA8201AF-1	18K
HA8201AF-3	15K

A3	C602	R606	C613	R620
2HEAD	—	—	—	—
4HEAD 3300PF	4.7K	.01μF		470
2H·LP				

*** VOLTAGE MEASUREMENT MODE**

PB ..... Parentheses ( )

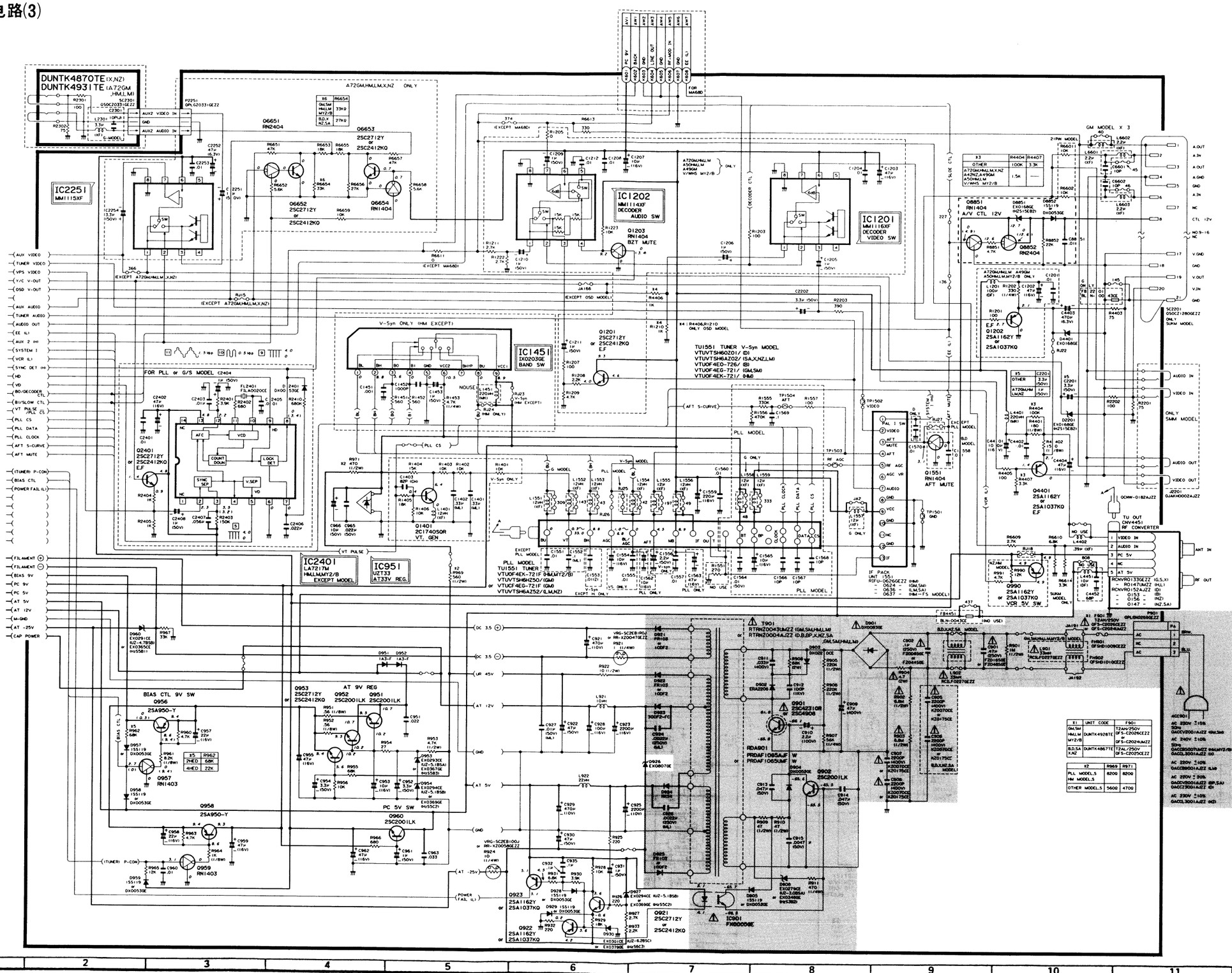
REC ..... Without Parentheses

● 电压测量数值

再现：括弧内的数值

记录：无括弧的数值

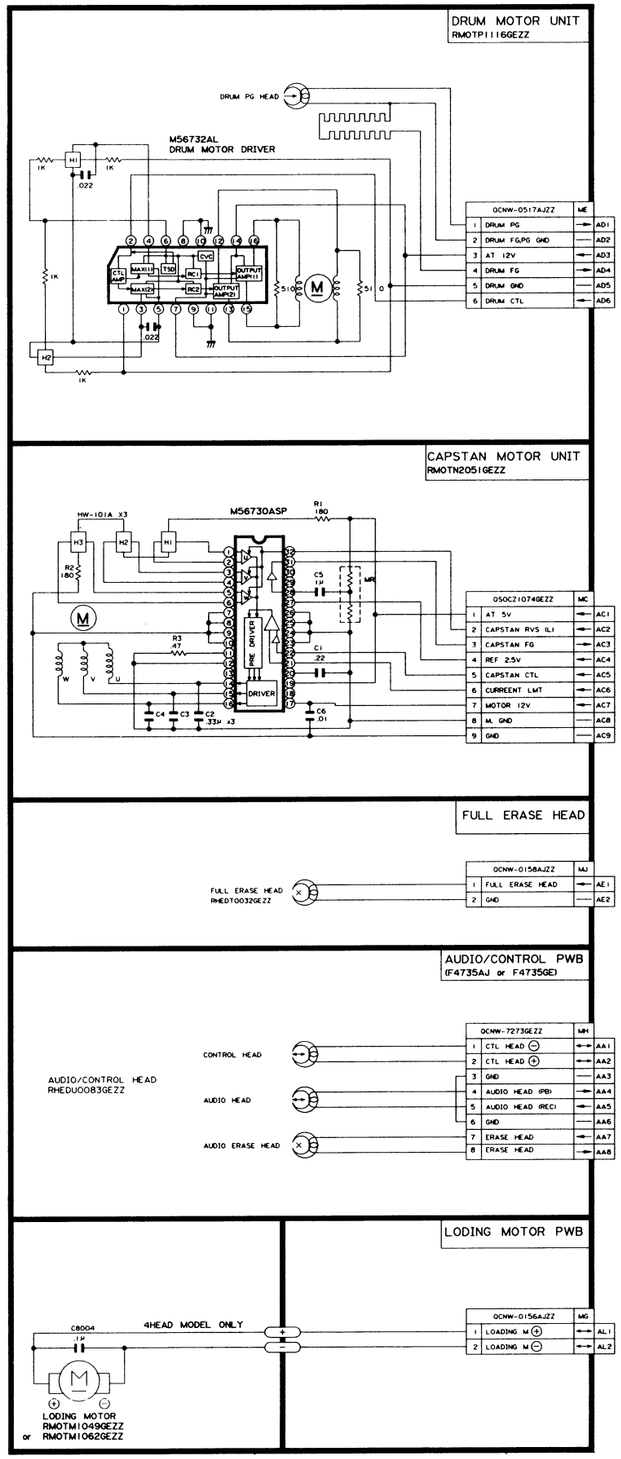
MAIN CIRCUIT (3)
主电路(3)

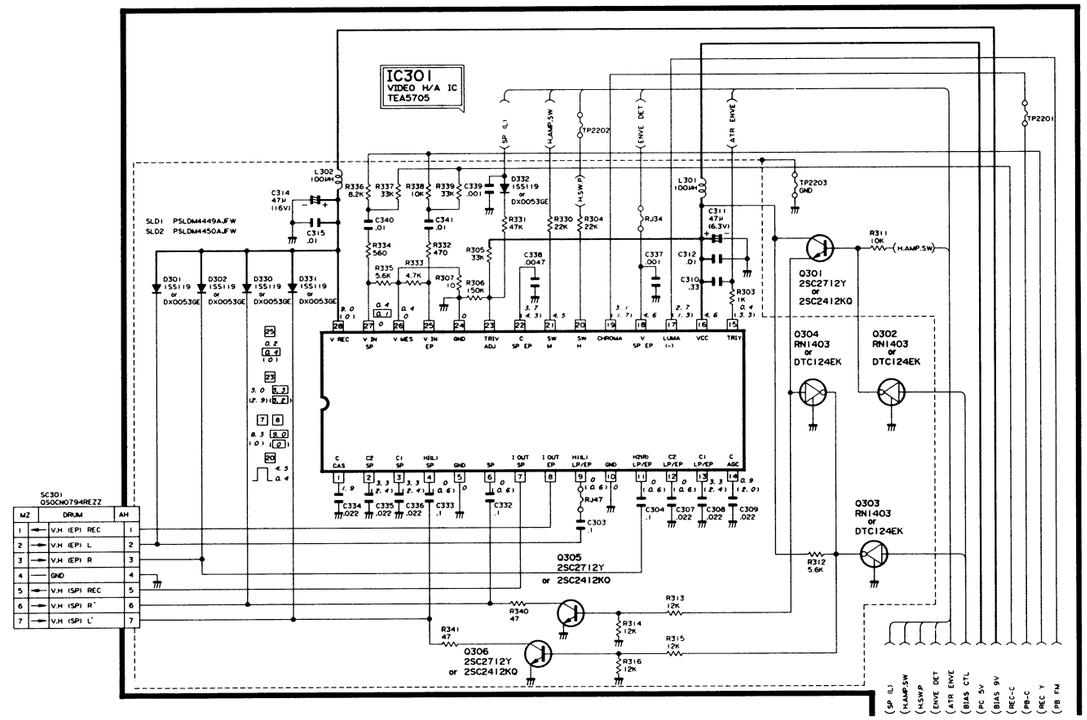


* VOLTAGE MEASUREMENT MODE
PB ..... Parentheses ( )
REC ..... Without Parentheses

● 电压测量数值
再现：括弧内的数值
记录：无括弧的数值

MAIN CIRCUIT (4)
主电路(4)





1 2 3 4 5 6 7 8 9 10 11 12

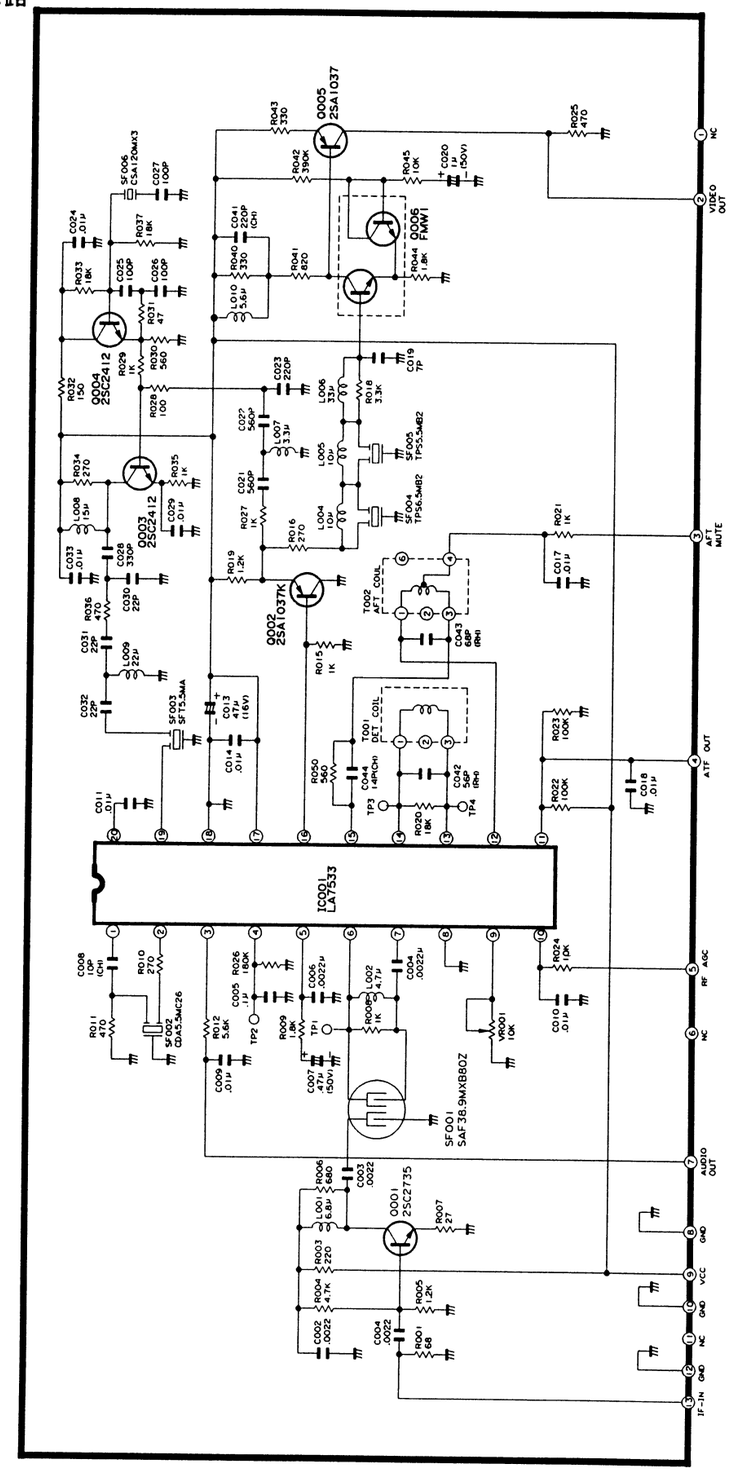
A B C D E F G H

*** VOLTAGE MEASUREMENT MODE**
PB ..... Parentheses ( )
REC ..... Without Parentheses

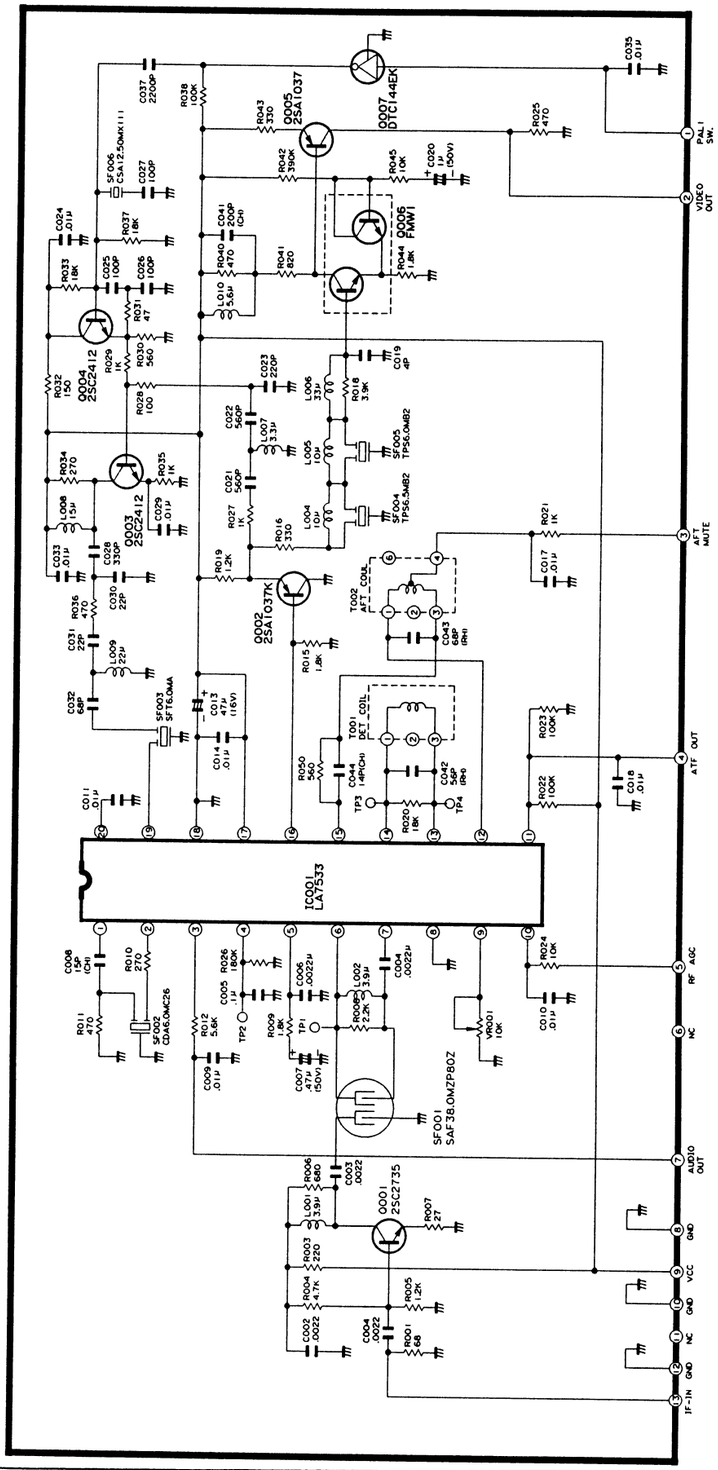
● 电压测量数值
再现：括弧内的数值
记录：无括弧的数值

IF PACK CIRCUIT
中频包电路

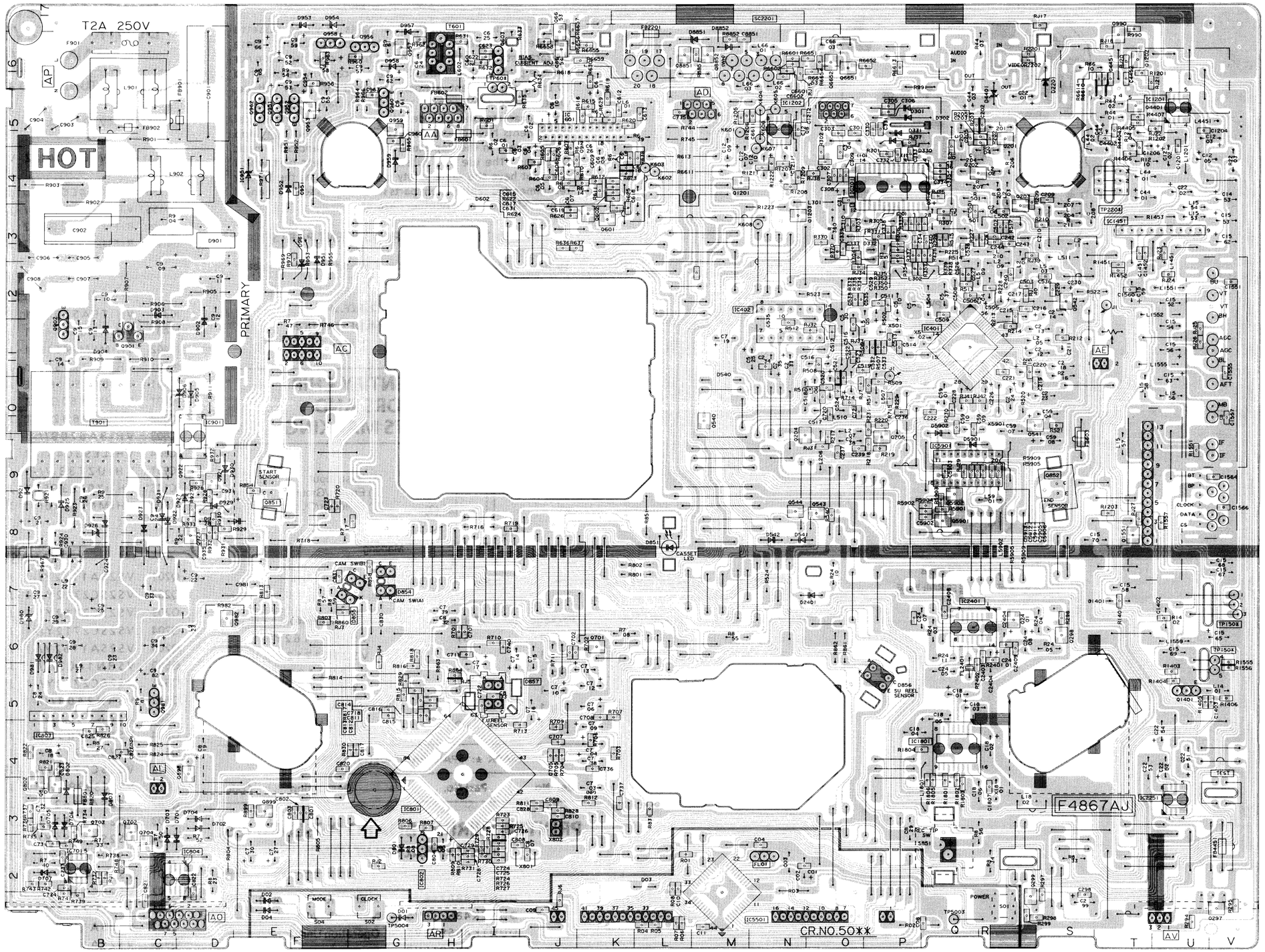
(VC-MA40B: RIFU-0632GEZZ)



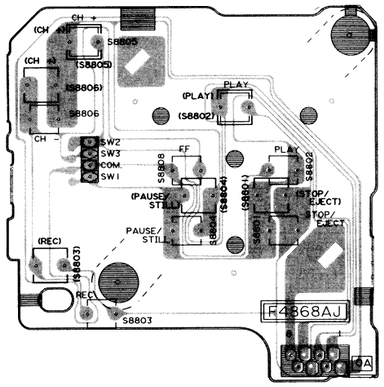
(VC-MA48D: RIFU-0634GEZZ)



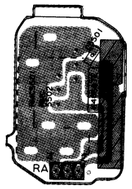
PWB FOIL PATTERN 印刷电路板图案



MAIN PWB 主电路印刷电路图



OPERATION PWB
工作电路印刷电路板



R/C RECEIVER PWB
遥控信号接收器印刷电路板

10. REPLACEMENT PARTS LIST
PARTS REPLACEMENT

Many electrical and mechanical parts in video cassette recorder have special safety-related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this manual; electrical components having such features are identified by ⚠ and shaded areas in the Replacement Parts Lists and Sche matic Diagrams. The use of a substitute replacement part which does not have the same safety characteristics as the factory recommended replacement parts shown in this service manual may create shock, fire or other hazards.

"HOW TO ORDER REPLACEMENT PARTS"

To have your order filled promptly and correctly, please furnish the following informations.

1. MODEL NUMBER **2. REF. NO.**
3. PART NO. **4. DESCRIPTION**
5. PRICE CODE

HOW TO IDENTIFY CHIP TRANSISTORS AND DIODES BY ITS MARKING

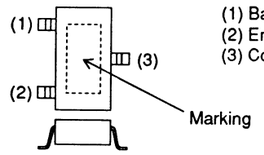


Fig. 1

Package	Marking	Parts No.
Fig. 1	SY	VS2SA1162Y/-1
Fig. 1	LY	VS2SC2712Y/-1
Fig. 1	YC	VSRN2403///-1
Fig. 1	XB	VSRN1402///-1
Fig. 1	XC	VSRN1403///-1
Fig. 1	XD	VSRN1404///-1

MARK ★: SPARE PARTS-DELIVERY SECTION.

Ref. No.	Part No.	★	Description	Code

PRINTED WIRING BOARD ASSEMBLIES
(NOT REPLACEMENT ITEM)

DUNTK4867TEV4	-	Main Unit (VC-MA40B)	—
DUNTK4867TEV5	-	Main Unit (VC-MA48D)	—
DUNTK4868TEV1	-	Operation Unit	—
DUNTK4869TEV2	-	R/C Receiver Unit	—

Ref. No.	Part No.	★	Description	Code

DUNTK4867TEV4 (VC-MA40B)
DUNTK4867TEV5 (VC-MA48D)
MAIN UNIT ASSEMBLY

TUNER AND ASSEMBLY

CNV4451	RCNVR0153AJZZ	V	RF Converter (VC-MA40B)	BG
CNV4451	RCNVR0152AJZZ	V	RF Converter (VC-MA48D)	BG
TU1551	VTUOF4EO-726/	J	VHF Tuner (VC-MA40B)	BD
TU1551	VTUVTSH6OZ01/	J	VHF Tuner (VC-MA48D)	BF
UNT1551	RiFU-0632GEZZ	J	IF-Pack (VC-MA40B)	BH
UNT1551	RiFU-0634GEZZ	J	IF-Pack (VC-MA48D)	BK

INTEGRATED CIRCUITS

IC301	VHiTEA5705/-1	J	Video H/A	AL
IC401	VHiHA8201F/-1	J	Y/C Processer	AW
IC402	VHiMSM7461R-1	J	CCD	AP
IC601	VHiBA7795LS-1	J	Audio Processor	AG
IC701	VHiBA15218F1E	J		AF
IC801	RH-iX0860GEZZ	J	Syscon/Servo/Timer	AY
IC802	VHiS806HZ//-1	J	Reset	AC
IC803	VHiBA6209//-1	J	Loading Motor Driver	AG
IC804	VHiLE93C46T-1	J	E²PROM	AF
IC951	VHiUZT33///-1	J	AT 33V Regulator	AC
IC1451	RH-iX0203GEZZ	J	Band Switch	AE
IC5001	VHiMN12510F-1	J	FLP Driver	AM

TRANSISTORS

Q201	VS2SA1162Y/-1	J	2SA1162Y	AB
Q202	VS2SC2712Y/-1	J	2SC2712Y	AB
Q203	VS2SC2712Y/-1	J	2SC2712Y	AB
Q204	VS2SC2712Y/-1	J	2SC2712Y	AB
Q205	VS2SA1162Y/-1	J	2SA1162Y	AB
Q540	VSRN1403///-1	J	RN1403	AA
Q541	VS2SC2712Y/-1	J	2SC2712Y	AB
Q542	VSRN2403///-1	J	RN2403	AB
Q543	VSRN1403///-1	J	RN1403	AA
Q544	VSRN1403///-1	J	RN1403	AA
Q601	VS2SC2712Y/-1	J	2SC2712Y	AB
Q602	VS2SC2712Y/-1	J	2SC2712Y	AB
Q603	VS2C3939SQR1E	J	2SC3939SQR	AC
Q702	VS2SA1162Y/-1	J	2SA1162Y	AB
Q703	VS2SA1162Y/-1	J	2SA1162Y	AB
Q801	VS2SA1162Y/-1	J	2SA1162Y	AB
Q802	VSRN1402///-1	J	RN1402	AA
⚠Q901	VS2SC4231QR-1	J	2SC4231QR	AA
⚠Q902	VS2SC2001LK-1	J	2SC2001LK	AA
Q921	VS2SC2712Y/-1	J	2SC2712Y	AB
Q922	VS2SA1162Y/-1	J	2SA1162Y	AB
Q923	VS2SA1162Y/-1	J	2SA1162Y	AB
Q951	VS2SC2001LK-1	J	2SC2001LK	AA

Ref. No.	Part No.	★	Description	Code
TRANSISTORS (Continued)				
Q952	VS2SC2001LK-1	J	2SC2001LK	AA
Q953	VS2SC2712Y/-1	J	2SC2712Y	AB
Q956	VS2SA950-Y/1E	J	2SA950	AD
Q957	VSRN1403///-1	J	RN1403	AA
Q958	VS2SA950-Y/1E	J	2SA950	AD
Q959	VSRN1403///-1	J	RN1403	AA
Q960	VS2SC2001LK-1	J	2SC2001LK	AA
Q1401	VS2C1740SQR1E	J	2SC1740SQR	AC
Q1551	VSRN1404///-1	J	RN1404	AA
Q4401	VS2SA1162Y/-1	J	2SA1162Y	AB
DIODES				
D301	VHD1SS119//-1	J	1SS119	AB
D302	VHD1SS119//-1	J	1SS119	AB
D330	VHD1SS119//-1	J	1SS119	AB
D331	VHD1SS119//-1	J	1SS119	AB
D332	VHD1SS119//-1	J	1SS119	AB
D540	VHD1SS119//-1	J	1SS119	AB
D541	VHD1SS119//-1	J	1SS119	AB
D542	VHD1SS119//-1	J	1SS119	AB
D602	VHD1SS119//-1	J	1SS119	AB
D701	VHD1SS119//-1	J	1SS119	AB
D702	VHD1SS119//-1	J	1SS119	AB
D703	VHD1SS119//-1	J	1SS119	AB
D704	VHD1SS119//-1	J	1SS119	AB
D705	VHD1SS119//-1	J	1SS119	AB
D706	VHD1SS119//-1	J	1SS119	AB
D707	VHD1SS119//-1	J	1SS119	AB
D801	VHD1SS119//-1	J	1SS119	AB
D802	VHD1SS119//-1	J	1SS119	AB
D803	VHD1SS119//-1	J	1SS119	AB
D851	RH-PX0234GEZZ	J	Photo Diode	AD
D854	RH-PX0231GEZZ	J	GP1S24	AF
D855	RH-PX0231GEZZ	J	GP1S24	AF
D856	RH-PX0232GEZZ	J	Photo Diode	AF
D857	RH-PX0232GEZZ	J	Photo Diode	AF
⚠D901	RH-DX0083GEZZ	J	Diode	AC
⚠D902	VHDERA2206/-1	J	ERA2206	AC
⚠D903	RH-DX0220CEZZ	J	Diode	AB
⚠D904	RH-DX0052GEZZ	J	Diode	AB
⚠D905	VHD1SS119//-1	J	1SS119	AB
⚠D906	RH-EX0279CEZZ	J	UZ3.0BSA	AA
⚠D921	VHDFR103///-1	J	FR103	AC
⚠D922	VHDFR103///-1	J	FR103	AC
⚠D923	VHD30DF2-FC-1	J	30DF2-FC	AE
⚠D924	VHDRK34////-1	J	RK34	AE
D925	VHDFR103///-1	J	FR103	AC
D926	RH-EX0807GEZZ	J	Zener Diode	AC
D927	RH-EX0294CEZZ	J	UZ-5.1BSB	AA
D928	VHD1SS119//-1	J	1SS119	AB
D929	VHD1SS119//-1	J	1SS119	AB
D930	RH-EX0301CEZZ	J	UZ-6.2BSC	AA
D951	VHD1A3-F///-1	J	1A3-F	AA
D952	VHD1A3-F///-1	J	1A3-F	AA

Ref. No.	Part No.	★	Description	Code
DIODES (Continued)				
D953	RH-EX0293CEZZ	J	UZ-5.1BSA	AA
D954	RH-EX0294CEZZ	J	UZ-5.1BSB	AA
D957	VHD1SS119//-1	J	1SS119	AB
D958	VHD1SS119//-1	J	1SS119	AB
D959	VHD1SS119//-1	J	1SS119	AB
D960	RH-EX0291CEZZ	J	Zener Diode	AA
D2201	RH-EX0168GEZZ	J	HZS15EB2	AA
D4401	RH-EX0168GEZZ	J	HZS15EB2	AA
D5001	VHD1SS119//-1	J	1SS119	AB
D5002	VHD1SS119//-1	J	1SS119	AB
D5003	VHD1SS119//-1	J	1SS119	AB
D5004	VHD1SS119//-1	J	1SS119	AB
⚠IC901	RH-FX0005GEZZ	J		AE
Q851	RH-PX0233GEZZ	J	Photo Diode	AD
Q852	RH-PX0233GEZZ	J	Photo Diode	AD
PACKAGED CIRCUITS				
X501	RCRSB0166GEZZ	J	Crystal, 4.43MHz	AF
X801	RCRSB0190GEZZ	J	Crystal, 10MHz	AK
X802	RCRSB0138GEZZ	J	Crystal,	AD
COILS AND TRANSFORMERS				
FL5001	RFiLC0115GEZZ	J		AC
L201	VP-XF151K0000	J	150µH	AB
L202	VP-XF150K0000	J	15µH	AB
L203	VP-XF330K0000	J	33µH	AB
L204	VP-XF120K0000	J	12µH	AB
L205	VP-XF820K0000	J	82µH	AB
L206	VP-DF1R2M0000	J	1.2µH	AB
L207	VP-XF560K0000	J	56µH	AB
L208	VP-XF151K0000	J	150µH	AB
L209	VP-XF560K0000	J	56µH	AB
L210	VP-XF151K0000	J	150µH	AB
L301	VP-DF101K0000	J	100µH	AB
L302	VP-DF101K0000	J	100µH	AB
L501	VP-MK561K0000	J	560µH	AB
L504	VP-XF150J0000	J	15µH	AB
L505	VP-XF100K0000	J	10µH	AB
L506	VP-XF390J0000	J	39µH	AB
L507	VP-YF682J0000	J	6800µH	AC
L509	VP-XF151K0000	J	150µH	AB
L510	VP-XF181K0000	J	180µH	AB
L511	VP-DF680K0000	J	68µH	AB
L601	VP-YF822J0000	J	8200µH	AC
L602	VP-DF221K0000	J	220µH	AB
⚠L902	RCiLF0227GEZZ	J	33mH	AM
L921	RCiLP0171CEZZ	J	Coil	AD
L922	RCiLP0175CEZZ	J	Coil	AD
L1401	VP-XF120K0000	J	12µH	AB
L4401	VP-MK221K0000	J	220µH	AB
T601	RTRNH0053GEZZ	J	Osc. Transformer	AE
⚠T901	RTRNZ0004AJZZ	V	Transformer	AS

Ref. No.	Part No.	★	Description	Code
	CONTROL			
R634	RVR-M4421GEZZ	J	100(B) Bias Current	AB
	CAPACITORS			
C201	VCKYD41HB681K	J	680 50V Ceramic	AA
C202	VCKYCY1HB391K	J	390p 50V Ceramic	AA
C203	VCCCCY1HH330J	J	33p 50V Ceramic	AA
C204	VCCSD41HL150J	J	15p 50V Ceramic	AA
C205	VCCCCY1HH330J	J	33p 50V Ceramic	AA
C206	VCCCCY1HH560J	J	56p 50V Ceramic	AA
C208	VCCCPA1HH560J	J	56p 50V Ceramic	AA
C209	VCKYCY1CF334Z	J	0.33 16V Ceramic	AA
C210	VCKYD41CY103N	J	0.01 16V Ceramic	AA
C211	VCCCPA1HH390J	J	39p 50V Ceramic	AA
C212	VCEAEA1HW474M	J	0.47 50V Electrolytic	AB
C213	VCKYPA1HF473Z	J	0.047 50V Ceramic	AA
C214	VCEAEA1HW224M	J	0.22 50V Electrolytic	AB
C215	VCCCPA1HH101J	J	100p 50V Ceramic	AA
C216	VCCCCY1HH100D	J	10p 50V Ceramic	AA
C217	VCEAEA1HW105M	J	1 50V Electrolytic	AB
C218	VCKYCY1HF103N	J	0.01 50V Ceramic	AA
C219	VCKYCY1EB223K	J	0.022 25V Ceramic	AA
C220	VCEAEA1HW335M	J	3.3 50V Electrolytic	AB
C221	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA
C222	VCKYCY1EF104Z	J	0.1 25V Ceramic	AA
C223	VCEAEA1HW335M	J	3.3 50V Electrolytic	AB
C224	VCEAEA1HW225M	J	2.2 50V Electrolytic	AB
C226	VCEAEA1HW474M	J	0.47 50V Electrolytic	AB
C228	VCEAEA1HW224M	J	0.22 50V Electrolytic	AB
C229	VCKYCY1EF104Z	J	0.1 25V Ceramic	AA
C230	VCEAEA0JW476M	J	47 6.3V Electrolytic	AB
C233	VCEAEA1HW105M	J	1 50V Electrolytic	AB
C234	VCKYCY1HF473Z	J	0.047 50V Ceramic	AA
C235	VCEAEA0JW476M	J	47 6.3V Electrolytic	AB
C236	VCKYCY1EF104Z	J	0.1 25V Ceramic	AA
C237	VCCCCY1HH330J	J	33p 50V Ceramic	AA
C238	VCCCD41HH4R7K	J	4.7p 50V Ceramic	AA
C239	VCCCCY1HH560J	J	56p 50V Ceramic	AA
C240	VCKYCY1HB391K	J	390p 50V Ceramic	AA
C242	VCCCCY1HH560J	J	56p 50V Ceramic	AA
C243	VCCCCY1HH470J	J	47p 50V Ceramic	AA
C244	VCCCCY1HH221J	J	220p 50V Ceramic	AA
C301	VCKYCY1HF223Z	J	0.022 50V Ceramic	AB
C302	VCKYCY1HF223Z	J	0.022 50V Ceramic	AB
C303	VCKYCY1EF104Z	J	0.1 25V Ceramic	AA
C304	VCKYCY1EF104Z	J	0.1 25V Ceramic	AA
C307	VCKYCY1HF223Z	J	0.022 50V Ceramic	AB
C308	VCKYCY1HF223Z	J	0.022 50V Ceramic	AB
C309	VCKYCY1HF223Z	J	0.022 50V Ceramic	AB
C310	VCKYCY1CF334Z	J	0.33 16V Ceramic	AA
C311	VCEAGA0JW476M	J	47 6.3V Electrolytic	AB
C312	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA
C314	VCEAGA1CW476M	J	47 16V Electrolytic	AB
C315	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA
C330	VCCCCY1HH330J	J	33p 50V Ceramic	AA

Ref. No.	Part No.	★	Description	Code
	CAPACITORS (Continued)			
C331	VCCCCY1HH330J	J	33p 50V Ceramic	AA
C332	VCKYCYEF104Z	J	0.1 25V Ceramic	AA
C333	VCKYCYEF104Z	J	0.1 25V Ceramic	AA
C334	VCKYCY1HF223Z	J	0.022 50V Ceramic	AA
C335	VCKYCY1HF223Z	J	0.022 50V Ceramic	AA
C336	VCKYCY1HF223Z	J	0.022 50V Ceramic	AA
C337	VCKYCY1HB102K	J	1000p 50V Ceramic	AA
C338	VCKYCY1HB472K	J	4700p 50V Ceramic	AA
C339	VCKYCY1HB102K	J	1000p 50V Ceramic	AA
C340	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA
C341	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA
C501	VCKYCY1HB332K	J	3300p 50V Ceramic	AA
C503	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA
C504	VCEAEA0JW476M	J	47 6.3V Electrolytic	AB
C505	VCKYCY1HF473Z	J	0.047 50V Ceramic	AA
C506	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA
C508	VCKYD41CY103N	J	0.01 16V Ceramic	AA
C509	VCKYCY1EB153K	J	0.015 25V Ceramic	AA
C510	VCEAGA1HW335M	J	3.3 50V Electrolytic	AB
C511	VCCCCY1HH330J	J	33p 50V Ceramic	AA
C512	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA
C513	VCKYCY1EF104Z	J	0.1 25V Ceramic	AA
C514	VCKYCY1HF333Z	J	0.033 50V Ceramic	AA
C515	VCKYCY1CF683Z	J	0.068 16V Ceramic	AA
C516	VCEAEA1HW475M	J	4.7 50V Electrolytic	AB
C517	VCCCCY1HH180J	J	18p 50V Ceramic	AA
C519	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA
C520	VCEAEA1HW474M	J	0.47 50V Electrolytic	AB
C521	VCKYCY1EB223K	J	0.022 25V Ceramic	AA
C522	VCCCCY1HH680J	J	68p 50V Ceramic	AA
C523	VCEAEA1CW106M	J	10 16V Electrolytic	AB
C524	VCCCCY1HH820J	J	82p 50V Ceramic	AA
C525	VCEAEA1HW105M	J	1 50V Electrolytic	AB
C526	VCCCCY1HH680J	J	68p 50V Ceramic	AA
C527	VCCCCY1HH470J	J	47p 50V Ceramic	AA
C528	VCCCCY1HH560J	J	56p 50V Ceramic	AA
C529	VCEAEA1HW475M	J	4.7 50V Electrolytic	AB
C530	VCCCPA1HH121J	J	120p 50V Ceramic	AA
C531	VCCSD41HL010M	J	1p 50V Ceramic	AA
C532	VCCCCY1HH470J	J	47p 50V Ceramic	AA
C533	VCCCCY1HH470J	J	47p 50V Ceramic	AA
C535	VCKYCY1HB391K	J	390p 50V Ceramic	AA
C536	VCCCCY1HH181J	J	180p 50V Ceramic	AA
C537	VCKYD41CY103N	J	0.01 16V Ceramic	AA
C601	VCKYCY1HB152K	J	1500p 50V Ceramic	AA
C602	VCKYD41CX332N	J	3300p 16V Ceramic	AA
C603	VCEAAA1HW475T	J	4.7 50V Electrolytic	AB
C604	VCEAGA1CW226M	J	22 16V Electrolytic	AB
C605	VCQYTA1HM123J	J	0.012 50V Mylar	AA
C606	VCKYCY1HB682K	J	6800p 50V Ceramic	AA
C607	VCEAGA1CW476M	J	47 16V Electrolytic	AB
C608	RC-KZ0029GEZZ	J	0.1 25V Ceramic	AA
C609	RC-KZ0029GEZZ	J	0.1 25V Ceramic	AA
C610	VCEAGA1CW226M	J	22 16V Electrolytic	AB
C611	VCEAGA1CW106M	J	10 16V Electrolytic	AB

Ref. No.	Part No.	★	Description			Code
	CAPACITORS (Continued)					
C612	VCKYCY1EB223K	J	0.022	25V	Ceramic	AA
C613	VCKYCY1HF103Z	J	0.01	50V	Ceramic	AA
C614	VCCCCY1HH151J	J	150p	50V	Ceramic	AA
C615	VCCCCY1HH151J	J	150p	50V	Ceramic	AA
C616	VCKYCY1HB331K	J	330p	50V	Ceramic	AA
C617	VCCCCY1HH220J	J	22p	50V	Ceramic	AA
C618	VCEAGA1CW106M	J	10	16V	Electrolytic	AB
C619	VCKYCY1HB821K	J	820p	50V	Ceramic	AA
C621	VCEAGA1CW476M	J	47	16V	Electrolytic	AB
C622	VCKYCY1HF103Z	J	0.01	50V	Ceramic	AA
C623	VCKYCY1HF103Z	J	0.01	50V	Ceramic	AA
C624	VCQPSA2AA562J	J	5600p	100V	Mylar	AC
C625	VCRYPA1HA221J	J	220p	50V	Ceramic	AA
C626	RC-KZ0029GEZZ	J	0.1	25V	Ceramic	AA
C701	VCKYCY1HB102K	J	1000p	50V	Ceramic	AA
C703	VCE9EA1HW105M	J	1	50V	Elect.(N.P.)	AC
C704	VCEAEA1HW105M	J	1	50V	Electrolytic	AB
C705	VCKYCY1HB102K	J	1000p	50V	Ceramic	AA
C706	VCEAEA1HW225M	J	2.2	50V	Electrolytic	AB
C707	VCKYCY1HB102K	J	1000p	50V	Ceramic	AA
C708	VCKYCY1HF103Z	J	0.01	50V	Ceramic	AA
C709	VCEAEA0JW476M	J	47	6.3V	Electrolytic	AB
C710	VCEAEA1CW106M	J	10	16V	Electrolytic	AB
C711	VCKYCY1HF103Z	J	0.01	50V	Ceramic	AA
C712	VCEAEA1HW225M	J	2.2	50V	Electrolytic	AB
C713	VCEAEA1HW225M	J	2.2	50V	Electrolytic	AB
C714	VCEAEA1CW226M	J	22	16V	Electrolytic	AB
C715	VCKYD41HB102K	J	1000p	50V	Ceramic	AA
C716	RC-EZ0123GEZZ	J	47	10V	Electrolytic	AB
C717	VCEAEA1HW105M	J	1.0	50V	Electrolytic	AB
C718	VCKYCY1HF103Z	J	0.01	50V	Ceramic	AA
C719	VCEAGA1HW105M	J	1	50V	Electrolytic	AB
C720	VCKYCY1HB102Z	J	1000p	50V	Ceramic	AA
C721	VCKYCY1HF103Z	J	0.01	50V	Ceramic	AA
C722	VCKYCY1EF104Z	J	0.1	25V	Ceramic	AA
C723	VCKYCY1HF103Z	J	0.01	50V	Ceramic	AA
C724	VCKYCY1HF103Z	J	0.01	50V	Ceramic	AA
C725	VCKYCY1HB472K	J	4700p	50V	Ceramic	AA
C726	VCKYCY1HF103Z	J	0.01	50V	Ceramic	AA
C727	VCEAEA0JW107M	J	100	6.3V	Electrolytic	AB
C728	VCKYCY1HB472K	J	4700p	50V	Ceramic	AA
C729	VCKYCY1HF103Z	J	0.01	50V	Ceramic	AA
C730	VCEAEA0JW336M	J	33	6.3V	Electrolytic	AB
C731	VCKYCY1HB102K	J	1000p	50V	Ceramic	AA
C732	VCFYSA1HB334J	J	0.33	50V	M.Polyester	AB
C733	VCKYCY1CF334Z	J	0.33	16V	Ceramic	AA
C734	VCKYCY1HF473Z	J	0.047	50V	Ceramic	AA
C736	VCKYCY1HF103Z	J	0.01	50V	Ceramic	AA
C737	VCKYCY1HF103Z	J	0.01	50V	Ceramic	AA
C738	VCEAEA1HW105M	J	1	50V	Electrolytic	AB
C740	VCKYCY1HB472K	J	4700p	50V	Ceramic	AA
C801	VCCCCY1HH470J	J	47p	50V	Ceramic	AA
C802	VCCCCY1HH470J	J	47p	50V	Ceramic	AA
C803	VCCCCY1HH470J	J	47p	50V	Ceramic	AA
C805	VCEAEA1HW105M	J	1	50V	Electrolytic	AB

Ref. No.	Part No.	★	Description			Code
	CAPACITORS (Continued)					
C807	VCCCCY1HH220J	J	22p	50V	Ceramic	AA
C808	VCCCCY1HH220J	J	22p	50V	Ceramic	AA
C809	VCCCCY1HH220J	J	22p	50V	Ceramic	AA
C811	VCKYCY1HF103Z	J	0.01	50V	Ceramic	AA
C812	VCKYCY1HF103Z	J	0.01	50V	Ceramic	AA
C815	VCKYCY1HF103Z	J	0.01	50V	Ceramic	AA
C816	VCKYD41CY103N	J	0.01	16V	Ceramic	AA
C817	VCKYCY1HB102K	J	1000p	50V	Ceramic	AA
C818	RC-EZ0425GEZZ	J	0.047F		Electrolytic	AE
C819	VCEAEA0JW108M	J	1000	6.3V	Electrolytic	AB
C820	VCKYCY1EF104Z	J	0.1	25V	Ceramic	AA
C821	VCCCCY1HH101J	J	100p	50V	Ceramic	AA
C822	VCKYCY1CF334Z	J	0.33	16V	Ceramic	AA
C823	VCKYCY1HF103Z	J	0.01	50V	Ceramic	AA
C824	VCEAGA1CW476M	J	47	16V	Electrolytic	AB
C825	VCKYCY1EF104Z	J	0.1	25V	Ceramic	AA
C826	VCE9GA1HW105M	J	1	50V	Elect.(N.P.)	AB
C828	VCCCCY1HH180J	J	18p	50V	Ceramic	AA
C829	VCKYD41CY103N	J	0.01	16V	Ceramic	AA
C830	VCKYD41HB102K	J	1000p	50V	Ceramic	AA
C831	VCKYCY1HB102K	J	1000p	50V	Ceramic	AA
C832	VCKYD41HB102K	J	1000p	50V	Ceramic	AA
C833	VCKYCY1HB102K	J	1000p	50V	Ceramic	AA
⚠C901	RC-FZ016SGEZZ	J	0.47	250V	M.Polyester	AK
⚠C902	RC-FZ008SGEZZ	J	0.1	250V	M.Polyester	AD
⚠C905	RC-KZ0070CEZZ	J	2200p	400V	Ceramic	AD
⚠C906	RC-KZ0070CEZZ	J	2200p	400V	Ceramic	AD
⚠C907	RC-KZ0070CEZZ	J	2200p	400V	Ceramic	AD
⚠C908	RC-KZ0070CEZZ	J	2200p	400V	Ceramic	AD
⚠C909	RC-EZ0440GEZZ	J	47	400V	Electrolytic	AH
⚠C910	VCEAGA2AW225M	J	2.2	100V	Electrolytic	AB
⚠C911	VCFYAA2GA333K	J	0.033	400V	M.Polyester	AD
⚠C912	RC-KZ0112CEZZ	J	100p	1kV	Ceramic	AB
⚠C913	VCQYTA1HM473J	J	0.047	50V	Mylar	AA
⚠C914	VCQYTA1HM473J	J	0.047	50V	Mylar	AA
⚠C915	VCQYTA1HM472J	J	4700p	50V	Mylar	AB
C921	VCEAGA1AW477M	J	470	10V	Electrolytic	AC
C922	VCEAGA1HW476M	J	47	50V	Electrolytic	AB
C923	VCEAVA1CN228M	J	2200	16V	Electrolytic	AH
⚠C924	RC-QZ0104GEZZ	J	2200p	250V	Mylar	AC
C925	VCEAVA1AN228M	J	2200	10V	Electrolytic	AD
⚠C926	RC-QZ0104GEZZ	J	2200p	250V	Mylar	AC
C927	VCQYTA1HM103J	J	0.01	50V	Mylar	AA
C928	VCEAGA1CW107M	J	100	16V	Electrolytic	AB
C929	VCEAGA1AW477M	J	470	10V	Electrolytic	AC
C930	VCEAGA1HW476M	J	47	50V	Electrolytic	AB
C931	VCEAGA1HW105M	J	1	50V	Electrolytic	AC
C932	VCKYCY1EF104Z	J	0.1	25V	Ceramic	AA
C935	VCKYCY1EF104Z	J	0.1	25V	Ceramic	AA
C951	VCKYCY1HF223Z	J	0.022	50V	Ceramic	AB
C952	VCEAGA1HW335M	J	3.3	50V	Electrolytic	AB
C953	VCEAGA1CW106M	J	10	16V	Electrolytic	AA
C954	VCEAGA1HW335M	J	3.3	50V	Electrolytic	AB
C955	VCEAGA1CW476M	J	47	16V	Electrolytic	AB
C957	VCEAGA1CW226M	J	22	16V	Electrolytic	AB

Ref. No.	Part No.	★	Description			Code

CAPACITORS (Continued)

C958	VCEAGA1CW226M	J	22	16V	Electrolytic	AB
C959	VCEAGA1CW476M	J	47	16V	Electrolytic	AB
C960	VCKYCY1HF103Z	J	0.01	50V	Ceramic	AA
C961	VCEAGA1HW105M	J	1	50V	Electrolytic	AC
C962	VCEAGA1CW476M	J	47	16V	Electrolytic	AB
C963	VCKYCY1HF333Z	J	0.033	50V	Ceramic	AA
C965	VCKYPA1HF223Z	J	0.022	50V	Ceramic	AA
C966	VCEAGA1HW106M	J	10	50V	Electrolytic	AC
C1401	VCFYSA1HA334J	J	0.33	50V	M.Polyester	AC
C1402	VCFYSA1HA334J	J	0.33	50V	M.Polyester	AC
C1403	VCCCCY1HH820J	J	82p	50V	Ceramic	AA
C1451	VCKYCY1HB102K	J	1000p	50V	Ceramic	AA
C1452	VCKYCY1HB102K	J	1000p	50V	Ceramic	AA
C1453	VCEAGA1HW105M	J	1	50V	Electrolytic	AC
C1551	VCKYCY1HF103Z	J	0.01	50V	Ceramic	AA
C1552	VCFYHA1HA104J	J	0.1	50V	M.Polyester	AB
C1553	VCKYPA1HF103Z	J	0.01	50V	Ceramic	AA
C1554	VCEAGA1CW106M	J	10	16V	Electrolytic	AA
C1555	VCKYCY1HF103Z	J	0.01	50V	Ceramic	AA
C1556	VCEAGA1HW225M	J	2.2	50V	Electrolytic	AB
C1557	VCKYCY1HF103Z	J	0.01	50V	Ceramic	AA
C1558	VCKYD41CY103N	J	0.01	16V	Ceramic	AA
C1559	VCEA2A1CW227M	J	220	16V	Electrolytic	AB
C1560	VCKYCY1HF103Z	J	0.01	50V	Ceramic	AA
C1570	VCKYD41CY103N	J	0.01	16V	Ceramic	AA
C2201	VCEAGA1HW335M	J	3.3	50V	Electrolytic	AB
C2202	VCEAGA1HW335M	J	3.3	50V	Electrolytic	AB
C4401	VCEAGA1CW107M	J	100	16V	Electrolytic	AB
C4402	VCKYCY1HF103Z	J	0.01	50V	Ceramic	AA
C4403	VCEA2A0JW477M	J	470	6.3V	Electrolytic	AB
C4404	VCEAGA1CW476M	J	47	16V	Electrolytic	AB
C5001	VCKYCY1HF103Z	J	0.01	50V	Ceramic	AA
C5002	VCEAGA0JW476M	J	47	6.3V	Electrolytic	AB
C5003	VCKYPA1HF103Z	J	0.01	50V	Ceramic	AA
C5004	VCCCCY1HH470J	J	47p	50V	Ceramic	AA
C5010	VCKYCY1HF103Z	J	0.01	50V	Ceramic	AA

RESISTORS

R201	VRS-CY1JF681J	J	680	1/16W	Metal Oxide	AA
R202	VRS-CY1JF333J	J	33k	1/16W	Metal Oxide	AA
R203	VRS-CY1JF103J	J	10k	1/16W	Metal Oxide	AA
R204	VRD-RA2BE561J	J	560	1/8W	Carbon	AA
R205	VRS-CY1JF392J	J	3.9k	1/16W	Metal Oxide	AA
R206	VRD-RA2BE561J	J	560	1/8W	Carbon	AA
R207	VRD-RA2BE561J	J	560	1/8W	Carbon	AA
R208	VRD-RA2BE561J	J	560	1/8W	Carbon	AA
R209	VRS-CY1JF152J	J	1.5k	1/16W	Metal Oxide	AA
R210	VRS-CY1JF222J	J	2.2k	1/16W	Metal Oxide	AA
R211	VRD-RA2BE271J	J	270	1/8W	Carbon	AA
R212	VRS-CY1JF222J	J	2.2k	1/16W	Metal Oxide	AA
R213	VRS-CY1JF222J	J	2.2k	1/16W	Metal Oxide	AA
R214	VRS-CY1JF103J	J	10k	1/16W	Metal Oxide	AA
R215	VRS-CY1JF222J	J	2.2k	1/16W	Metal Oxide	AA
R217	VRS-CY1JF102J	J	1k	1/16W	Metal Oxide	AA

Ref. No.	Part No.	★	Description			Code

RESISTORS (Continued)

R219	VRS-CY1JF122J	J	1.2k	1/16W	Metal Oxide	AA
R220	VRS-CY1JF152J	J	1.5k	1/16W	Metal Oxide	AA
R226	VRS-CY1JF102J	J	1k	1/16W	Metal Oxide	AA
R228	VRD-RA2BE102J	J	1k	1/8W	Carbon	AA
R229	VRD-RA2BE103J	J	10k	1/8W	Carbon	AA
R230	VRS-CY1JF103J	J	10k	1/16W	Metal Oxide	AA
R301	VRS-CY1JF681J	J	680	1/16W	Metal Oxide	AA
R302	VRS-CY1JF681J	J	680	1/16W	Metal Oxide	AA
R303	VRS-CY1JF102J	J	1k	1/16W	Metal Oxide	AA
R304	VRS-CY1JF223J	J	22k	1/16W	Metal Oxide	AA
R305	VRD-RA2BE333J	J	33k	1/8W	Carbon	AA
R306	VRS-CY1JF154J	J	150k	1/16W	Metal Oxide	AA
R307	VRS-CY1JF100J	J	10	1/16W	Metal Oxide	AA
R330	VRS-CY1JF223J	J	22k	1/16W	Metal oxide	AA
R331	VRS-CY1JF473J	J	47k	1/16W	Metal Oxide	AA
R332	VRS-CY1JF471J	J	470	1/16W	Metal Oxide	AA
R333	VRS-CY1JF472J	J	4.7k	1/16W	Metal Oxide	AA
R334	VRS-CY1JF561J	J	560	1/16W	Metal Oxide	AA
R335	VRS-CY1JF562J	J	5.6k	1/16W	Metal Oxide	AA
R336	VRS-CY1JF822J	J	8.2k	1/16W	Metal Oxide	AA
R337	VRS-CY1JF333J	J	33k	1/16W	Metal Oxide	AA
R338	VRS-CY1JF103J	J	10k	1/16W	Metal Oxide	AA
R339	VRS-CY1JF333J	J	33k	1/16W	Metal Oxide	AA
R501	VRD-RA2BE102J	J	1.0	1/8W	Carbon	AA
R502	VRS-CY1JF821J	J	820	1/16W	Metal Oxide	AA
R506	VRS-CY1JF103J	J	10k	1/16W	Metal Oxide	AA
R507	VRS-CY1JF103J	J	10k	1/16W	Metal Oxide	AA
R508	VRS-CY1JF122J	J	1.2k	1/16W	Metal Oxide	AA
R510	VRS-CY1JF273J	J	27k	1/16W	Metal Oxide	AA
R513	VRS-CY1JF102J	J	1k	1/16W	Metal Oxide	AA
R515	VRS-CY1JF102J	J	1k	1/16W	Metal Oxide	AA
R517	VRS-CY1JF102J	J	1k	1/16W	Metal Oxide	AA
R520	VRD-RA2BE102J	J	1k	1/8W	Carbon	AA
R521	VRS-CY1JF104J	J	100k	1/16W	Metal Oxide	AA
R522	VRD-RA2BE103J	J	10k	1/8W	Carbon	AA
R523	VRD-RA2BE103J	J	10k	1/8W	Carbon	AA
R524	VRD-RA2BE103J	J	10k	1/8W	Carbon	AA
R540	VRS-CY1JF103J	J	10k	1/16W	Metal Oxide	AA
R601	VRS-CY1JF100J	J	10	1/16W	Metal Oxide	AA
R602	VRS-CY1JF333J	J	33k	1/16W	Metal Oxide	AA
R603	VRS-CY1JF221J	J	220	1/16W	Metal Oxide	AA
R604	VRS-CY1JF274J	J	270k	1/16W	Metal Oxide	AA
R605	VRS-CY1JF103J	J	10	1/16W	Metal Oxide	AA
R606	VRS-CY1JF472J	J	4.7	1/16W	Metal Oxide	AA
R607	VRS-CY1JF332J	J	3.3k	1/16W	Metal Oxide	AA
R608	VRS-CY1JF822J	J	8.2k	1/16W	Metal Oxide	AA
R609	VRS-CY1JF332J	J	3.3k	1/16W	Metal Oxide	AA
R610	VRS-CY1JF225J	J	2.2M	1/16W	Metal Oxide	AA
R611	VRS-CY1JF563J	J	56k	1/16W	Metal Oxide	AA
R612	VRS-CY1JF472J	J	4.7k	1/16W	Metal Oxide	AA
R613	VRD-RA2BE473J	J	47k	1/8W	Carbon	AA
R614	VRS-CY1JF562J	J	5.6k	1/16W	Metal Oxide	AA
R615	VRS-CY1JF823J	J	82k	1/16W	Metal Oxide	AA
R616	VRS-CY1JF183J	J	18k	1/16W	Metal Oxide	AA
R617	VRS-CY1JF152J	J	1.5k	1/16W	Metal Oxide	AA

Ref. No.	Part No.	★	Description	Code
	RESISTORS (Continued)			
R618	VRD-RA2BE153J	J	15k 1/8W Carbon	AA
R619	VRS-CY1JF101J	J	100 1/16W Metal Oxide	AA
R620	VRS-CY1JF471J	J	470 1/16W Metal Oxide	AA
R621	VRD-RA2BE683J	J	68k 1/8W Carbon	AA
R622	VRS-CY1JF683J	J	68k 1/16W Metal Oxide	AA
R623	VRS-CY1JF333J	J	33k 1/16W Metal Oxide	AA
R624	VRS-CY1JF563J	J	56k 1/16W Metal Oxide	AA
R625	VRS-CY1JF103J	J	10k 1/16W Metal Oxide	AA
R626	VRS-CY1JF332J	J	3.3k 1/16W Metal Oxide	AA
R629	VRS-CY1JF153J	J	15k 1/16W Metal Oxide	AA
R630	VRS-CY1JF103J	J	10k 1/16W Metal Oxide	AA
R631	VRS-CY1JF470J	J	47 1/16W Metal Oxide	AA
R632	VRS-CY1JF682J	J	6.8k 1/16W Metal Oxide	AA
R633	VRG-SC2EB4R7J	J	4.7 1/4W Fuse Resistor	AB
R634	*See Control*			
R635	VRS-CY1JF153J	J	15k 1/16W Metal Oxide	AA
R636	VRS-CY1JF562J	J	5.6k 1/16W Metal Oxide	AA
R637	VRS-CY1JF682J	J	6.8k 1/16W Metal Oxide	AA
R638	VRS-CY1JF103J	J	10k 1/16W Metal Oxide	AA
R639	VRD-RA2BE153J	J	15k 1/8W Carbon	AA
R701	VRS-CY1JF272J	J	2.7k 1/16W Metal Oxide	AA
R703	VRS-CY1JF223J	J	22k 1/16W Metal Oxide	AA
R704	VRS-CY1JF222J	J	2.2k 1/16W Metal Oxide	AA
R705	VRS-CY1JF154J	J	150k 1/16W Metal Oxide	AA
R706	VRS-CY1JF223J	J	22k 1/16W Metal Oxide	AA
R707	VRS-CY1JF102J	J	1k 1/16W Metal Oxide	AA
R708	VRD-RA2BE103J	J	10k 1/8W Carbon	AA
R709	VRS-CY1JF103J	J	10k 1/16W Metal Oxide	AA
R710	VRS-CY1JF102J	J	1k 1/16W Metal Oxide	AA
R711	VRD-RA2BE102J	J	1k 1/8W Carbon	AA
R713	VRS-CY1JF102J	J	1k 1/16W Metal Oxide	AA
R714	VRS-CY1JF562J	J	5.6k 1/16W Metal Oxide	AA
R715	VRS-CY1JF682J	J	6.8k 1/16W Metal Oxide	AA
R716	VRD-RA2BE393J	J	39k 1/8W Carbon	AA
R717	VRD-RA2BE183J	J	18k 1/8W Carbon	AA
R718	VRS-CY1JF102J	J	1k 1/16W Metal Oxide	AA
R719	VRS-CY1JF823J	J	82k 1/16W Metal Oxide	AA
R720	VRS-CY1JF153J	J	15k 1/16W Metal Oxide	AA
R723	VRS-CY1JF224J	J	220k 1/16W Metal Oxide	AA
R724	VRS-CY1JF104J	J	100k 1/16W Metal Oxide	AA
R725	VRS-CY1JF563J	J	56k 1/16W Metal Oxide	AA
R726	VRS-CY1JF474J	J	470k 1/16W Metal Oxide	AA
R727	VRS-CY1JF272J	J	2.7k 1/16W Metal Oxide	AA
R728	VRS-CY1JF224J	J	220k 1/16W Metal Oxide	AA
R729	VRS-CY1JF683J	J	68k 1/16W Metal Oxide	AA
R730	VRS-CY1JF334J	J	330k 1/16W Metal Oxide	AA
R731	VRS-CY1JF392J	J	3.9k 1/16W Metal Oxide	AA
R732	VRS-CY1JF473J	J	47k 1/16W Metal Oxide	AA
R733	VRD-RA2BE155J	J	1.5M 1/8W Carbon	AA
R734	VRS-CY1JF223J	J	22k 1/16W Metal Oxide	AA
R735	VRS-CY1JF103J	J	10k 1/16W Metal Oxide	AA
R736	VRS-CY1JF103J	J	10k 1/16W Metal Oxide	AA
R737	VRS-CY1JF103J	J	10k 1/16W Metal Oxide	AA
R738	VRD-RA2BE223J	J	22k 1/8W Carbon	AA
R739	VRS-CY1JF153J	J	15k 1/16W Metal Oxide	AA

Ref. No.	Part No.	★	Description	Code
	RESISTORS (Continued)			
R741	VRS-CY1JF104J	J	100k 1/16W Metal Oxide	AA
R742	VRS-CY1JF273J	J	27k 1/16W Metal Oxide	AA
R743	VRS-CY1JF334J	J	330k 1/16W Metal Oxide	AA
R744	VRD-RA2HD1R0J	J	1 1/2W Carbon	AA
R745	VRD-RA2HD1R0J	J	1 1/2W Carbon	AA
R746	VRD-RA2BE102J	J	1k 1/8W Carbon	AA
R747	VRD-RA2BE103J	J	10k 1/8W Carbon	AA
R748	VRS-CY1JF223J	J	22k 1/16W Metal Oxide	AA
R752	VRD-RA2BE471J	J	470 1/8W Carbon	AA
R801	VRD-RA2BE102J	J	1k 1/16W Carbon	AA
R802	VRD-RA2BE102J	J	1k 1/16W Carbon	AA
R803	VRS-CY1JF471J	J	470 1/16W Metal Oxide (VC-MA48D)	AA
R804	VRD-RA2BE471J	J	470 1/8W Carbon	AA
R805	VRD-RA2BE471J	J	470 1/8W Carbon	AA
R806	VRS-CY1JF471J	J	470 1/16W Metal Oxide	AA
R807	VRS-CY1JF471J	J	470 1/16W Metal Oxide	AA
R809	VRS-CY1JF102J	J	1k 1/16W Metal Oxide	AA
R810	VRS-CY1JF102J	J	1k 1/16W Metal Oxide	AA
R811	VRS-CY1JF224J	J	220k 1/16W Metal Oxide	AA
R812	VRS-CY1JF471J	J	470 1/16W Metal Oxide	AA
R813	VRS-CY1JF103J	J	10k 1/16W Metal Oxide	AA
R814	VRD-RA2BE102J	J	1k 1/8W Carbon	AA
R815	VRS-CY1JF104J	J	100k 1/16W Metal Oxide	AA
R820	VRD-RA2HD680J	J	68 1/2W Carbon	AA
R821	VRS-CY1JF472J	J	4.7k 1/16W Metal Oxide	AA
R822	VRS-CY1JF273J	J	27k 1/16W Metal Oxide	AA
R823	VRD-RA2BE471J	J	470 1/8W Carbon	AA
R824	VRD-RA2BE103J	J	10k 1/8W Carbon	AA
R825	VRD-RA2BE103J	J	10k 1/8W Carbon	AA
R829	VRS-CY1JF473J	J	47k 1/16W Metal Oxide	AA
R851	VRD-RA2EE151J	J	150 1/4W Carbon	AA
R854	VRS-CY1JF123J	J	12k 1/16W Metal Oxide	AA
R855	VRD-RA2BE123J	J	12k 1/8W Carbon	AA
R856	VRD-RA2BE103J	J	10k 1/8W Carbon	AA
R857	VRD-RA2BE271J	J	270 1/8W Carbon	AA
R858	VRS-CY1JF104J	J	100k 1/16W Metal Oxide	AA
R859	VRD-RA2BE271J	J	270 1/8W Carbon	AA
R860	VRS-CY1JF104J	J	100k 1/16W Metal Oxide	AA
R861	VRD-RA2BE221J	J	220 1/8W Carbon	AA
R862	VRD-RA2BE154J	J	150k 1/8W Carbon	AA
R863	VRD-RA2BE221J	J	220 1/8W Carbon	AA
R864	VRD-RA2BE154J	J	150k 1/8W Metal Oxide	AA
R901	VRD-RA2HD105J	J	1M 1/2W Carbon	AA
⚠R902	VRC-UA2HG685K	J	6.8M 1/2W Solid	AA
⚠R903	VRC-UA2HG685K	J	6.8M 1/2W Solid	AA
⚠R904	RR-WZ0003GEZZ	J	4.7 2W	AD
⚠R905	VRD-RA2HD224J	J	220k 1/2W Carbon	AA
⚠R906	VRD-RA2HD224J	J	220k 1/2W Carbon	AA
⚠R907	VRD-RA2EE563J	J	56k 1/4W Carbon	AA
⚠R908	RR-SZ0007GEZZ	J		AB
⚠R909	VRD-RA2HD470J	J	47 1/2W Carbon	AA
⚠R910	VRD-RA2HD470J	J	47 1/2W Carbon	AA
R911	VRD-RA2EE471J	J	470 1/4W Carbon	AA
R921	VRG-SC2EB1R0J	J	1 1/4W Fuse Resistor	AB

Ref. No.	Part No.	★	Description	Code
RESISTORS (Continued)				
R922	VRD-RA2HD100J	J	10 1/2W Carbon	AA
R924	VRG-SC2EB100J	J	10 1/4W Fuse Resistor	AB
R925	VRD-RA2BE221J	J	220 1/8W Carbon	AA
R926	VRS-CY1JF221J	J	220 1/16W Metal Oxide	AA
R927	VRS-CY1JF272J	J	2.7k 1/16W Metal Oxide	AA
R928	VRS-CY1JF103J	J	10k 1/16W Metal Oxide	AA
R929	VRS-CY1JF183J	J	18k 1/16W Metal Oxide	AA
R930	VRS-CY1JF392J	J	3.9k 1/16W Metal Oxide	AA
R931	VRS-CY1JF682J	J	6.8k 1/16W Metal Oxide	AA
R932	VRS-CY1JF221J	J	220 1/16W Metal Oxide	AA
R933	VRS-CY1JF222J	J	2.2k 1/16W Metal Oxide	AA
R951	VRD-RA2BER56J	J	0.56 1/8W Carbon	AA
R952	VRD-RA2BER56J	J	0.56 1/8W Carbon	AA
R953	VRD-RA2HD472J	J	4.7k 1/2W Carbon	AA
R954	VRD-RA2BE270J	J	27 1/8W Carbon	AA
R955	VRD-RA2BE683J	J	68k 1/8W Carbon	AA
R956	VRS-CY1JF103J	J	10k 1/16W Metal Oxide	AA
R960	VRS-CY1JF472J	J	4.7k 1/16W Metal Oxide	AA
R961	VRD-RA2BE822J	J	8.2k 1/8W Carbon	AA
R962	VRS-CY1JF223J	J	22k 1/16W Metal Oxide	AA
R963	VRS-CY1JF472J	J	4.7k 1/16W Metal Oxide	AA
R964	VRD-RA2BE102J	J	1k 1/8W Carbon	AA
R965	VRS-CY1JF123J	J	12k 1/16W Metal Oxide	AA
R966	VRD-RA2BE681J	J	680 1/8W Carbon	AA
R967	VRD-RA2BE333J	J	33k 1/8W Carbon	AA
R969	VRD-RA2HD561J	J	560 1/2W Caron	AA
R971	VRD-RA2HD471J	J	470 1/2W Carbon	AA
R1401	VRS-CY1JF103J	J	10k 1/16W Metal Oxide	AA
R1402	VRS-CY1JF103J	J	10k 1/16W Metal Oxide	AA
R1403	VRS-CY1JF103J	J	10k 1/16W Metal Oxide	AA
R1404	VRS-CY1JF153J	J	15k 1/16W Metal Oxide	AA
R1405	VRS-CY1JF183J	J	18k 1/16W Metal Oxide	AA
R1406	VRS-CY1JF103J	J	10k 1/16W Metal Oxide	AA
R1451	VRS-CY1JF561J	J	560 1/16W Metal Oxide	AA
R1452	VRS-CY1JF561J	J	560 1/16W Metal Oxide	AA
R1453	VRD-RA2EE472J	J	4.7k 1/4W Carbon	AA
R2201	VRS-CY1JF750J	J	75 1/16W Metal Oxide	AA
R2202	VRS-CY1JF101J	J	100 1/16W Metal Oxide	AA
R2203	VRD-RA2BE391J	J	390 1/8W Carbon	AA
R4401	VRD-RA2BE181J	J	180 1/8W Carbon	AA
R4402	VRD-RA2BE151J	J	150 1/8W Carbon	AA
R4403	VRD-RA2BE750J	J	75 1/8W Carbon	AA
R4404	VRS-CY1JF104J	J	100k 1/16W Metal Oxide	AA
R4405	VRS-CY1JF101J	J	100 1/16W Metal Oxide	AA
R4407	VRS-CY1JF332J	J	3.3k 1/16W Metal Oxide	AA
R5001	VRS-CY1JF471J	J	470 1/16W Metal Oxide	AA
R5002	VRD-RA2EE1R0J	J	1.0 1/4W Carbon	AA
R5003	VRD-RA2BE104J	J	100k 1/8W Carbon	AA
R5004	VRS-CY1JF104J	J	100k 1/16W Metal Oxide	AA
R5005	VRS-CY1JF104J	J	100k 1/16W Metal Oxide	AA
R5006	VRS-CY1JF104J	J	100k 1/16W Metal Oxide	AA
R5007	VRS-CY1JF104J	J	100k 1/16W Metal Oxide	AA
R6609	VRS-CY1JF272J	J	2.7k 1/16W Metal Oxide	AA
R6610	VRS-CY1JF682J	J	6.8k 1/16W Metal Oxide	AA
R6613	VRS-CY1JF331J	J	330k 1/16W Metal Oxide	AA

Ref. No.	Part No.	★	Description	Code
MISCELLANEOUS PARTS				
⚠ACC901	QACCV2001AJZZ	V	AC Cord (VC-MA40B)	AQ
⚠ACC901	QACCZ3001AJZZ	V	AC Cord (VC-MA48D)	AT
DG5001	VVK10BT143G-1	J	Fluorescent Display Tube	AV
⚠F901	QFS-C2025CEZZ	J	Fuse T2AL/250V	AQ
FB801	RBLN-0013GEZZ	J	Ferrite Bead	AA
⚠FH901	QFSHD1009CEZZ	J	Fuse Holder	AA
⚠FH902	QFSHD1010CEZZ	J	Fuse Holder	AA
J2201	QJAKH0002AJZZ	V	Jack A/V	AL
P601	QPLGN0247REZZ	J	Plug, 2pin (AE)	AA
P701	QPLGZ0657GEZZ	J	Plug, 6pin (AO)	AC
P702	QPLGN0247REZZ	J	Plug, 2pin (AL)	AA
P704	QPLGZ1074GEZZ	J	Plug, 10pin (AC)	AC
P705	QPLGZ0360GEZZ	J	Plug, 3pin (AR)	AA
⚠P901	QPLGN0269GEZZ	J	Plug, 2pin (PA)	AB
SC301	QSOCN0794REZZ	J	Socket, 7pin (AH)	AC
SC601	QSOCN0884REZZ	J	Socket, 8pin (AA)	AC
SC701	QSOCN0684REZZ	J	Socket, 6pin (AD)	AB
S851	QSW-F0042AJZZ	V	Switch, Rec	AC
S5001	QSW-K0002AJZZ	V	Switch, Power	AD
S5002	QSW-K0002AJZZ	V	Switch, TV/VCR	AD
S5004	QSW-K0002AJZZ	V	Switch, Set-up	AD

—— End of Main ——

Ref. No.	Part No.	★	Description	Code

DUNTK4868TEV1
OPERATION UNIT

MISCELLANEOUS PARTS

SC8801	QSOCZ0657GEZZ	J	Socket 6-pin (OA)	AB
S8801	QSW-K0079GEZZ	J	Switch, Stop/Eject	AB
S8802	QSW-K0079GEZZ	J	Switch, Play	AB
S8803	QSW-K0079GEZZ	J	Switch, REC	AB
S8804	QSW-K0079GEZZ	J	Switch, Pause/Still	AB
S8805	QSW-K0079GEZZ	J	Switch, CH (+)	AB
S8806	QSW-K0079GEZZ	J	Switch, CH (−)	AB
S8809	QSW-Z0069GEZZ	J	Switch, Shuttle	AK

—— End of Operation ——

DUNTK4869TEV2
R/C RECEIVER UNIT

MISCELLANEOUS PARTS

SC5501	QSOCZ0360GEZZ	J	Socket 3-pin (RA)	AC
RMC5502	RRMCU0209CEZZ	J	Remote Control Receiver	AH

—— End of R/C Receiver ——

INFRARED REMOTE CONTROL UNIT

	RRMCG0023AJSA	V	Infrared Remote Control Unit	
	93GHR14172001	V	Battery cover, Infrared Remote Control Unit	AE

—— End of Infrared Remote Control Unit ——

MECHANISM CHASSIS PARTS

Ref. No.	Part No.	★	Description	Code
1	LCHSM0148AJZZ	V	Main Chassis Ass'y	AY
2	NROLP0084AJZZ	V	Supply Impedance Roller	AB
3	PGiDH0031AJFW	V	Supply Impedance Roller Frange	AD
4	PGiDS0027AJZZ	V	Supply Impedance Roller Lower Frange	AA
5	NSFTL0563AJFW	V	Supply Impedance Roller Inner	AE
6	LPOLM0050GEZZ	J	Supply Pole Base Ass'y	AM
7	LPOLM0051GEZZ	J	Take-Up Pole Base Ass'y	AM
8	NROLP0110GEZZ	J	Guide Roller	AH
9	MLEVF0414AJZZ	V	Reverse Guide Lever Ass'y	AG
10	MSPRD0147AJFJ	V	Reverse Guide Spring	AB
11	PSPAZ0391AJZZ	V	Reverse Guide Spacer	AE
12	RHEDU0083GEZZ	J	Audio/Control Head	AR
13	MLEVF0415AJFW	V	Audio/Control Head Arm	AC
14	MSPRD0148AJFJ	V	Audio/Control Head Arm Spring	AB
15	MSPRC0189AJFJ	V	Azimuth Spring	AB
16	RHEDT0032GEZZ	J	Full Erase Head	AK
17	PSPAZ0392AJZZ	V	Audio/Control Head Arm Spacer	AB
18	QPWBF4735AJZZ	V	Audio/Control Head PWB	AC
19	QSOCN0885REZZ	J	Socket, 8 pin	AB
20	NBLTK0065AJ00	V	Reel Belt	AE
21	MLEVF0416GEZZ	J	Pinch Roller Lever Ass'y	AU
22	MLEVP0237AJZZ	V	Pinch Double Action Lever	AD
23	MLEVF0417AJZZ	V	Pinch Drive Lever Ass'y	AG
24	NGERH1216AJZZ	V	Pinch Drive Cam	AE
25	MLEVP0238AJZZ	V	Open Lever	AC
26	MSPRT0377AJFJ	V	Pinch Double Action Spring	AC
27	MSPRD0149AJFJ	V	Earth Spring	AB
28	MLEVF0418AJZZ	V	Tension Arm Ass'y	AG
29	LBOSZ1001AJZZ	V	Tension Arm Boss	AB
30	MSPRT0378AJFJ	V	Tension Spring	AC
31	LBNDK1008AJZZ	V	Tension Band Ass'y	AG
32	NSFTP0032AJZZ	V	Tension Pole Adjust Cam	AB
33	NGERH1217AJ00	V	Master Cam	AE
34	NPLYV0146AJZZ	V	Motor Pulley	AB
35	NGERW1051AJZZ	V	Worm Gear	AC
36	NGERW1052AJZZ	V	Worm Wheel Gear	AC
37	NGERH1218AJZZ	V	Connect Gear	AC
38	LANGK0161AJZZ	V	Loading Motor Angle Ass'y	AD
39	NBRGP0017AJZZ	V	Bearing	AB
40	MSLiP0006AJZZ	V	Sifter	AH
41	MLEVF0419AJZZ	V	Sifter Drive Lever Ass'y	AG
42	NGERH1219AJZZ	V	Take-Up Loading Gear	AD
43	MLEVF0420AJZZ	V	Take-Up Loading Arm Ass'y	AG
44	NGERH1220AJZZ	V	Supply Loading Gear	AC
45	MLEVF0422AJZZ	V	Supply Loading Arm Ass'y	AG
46	CLEVP0239AJ00	V	Auto Head Cleaner Ass'y	AF
47	MSPRT0379AJFJ	V	Loading Double Action Spring	AB
48	NDAiV1065AJ00	V	Reel Disk	AB
49	MARMP0053AJZZ	V	Reel Idler	AM
50	MLEVP0240AJZZ	V	Clutch Lever	AB
51	NGERH1221AJZZ	V	Clutch Gear Ass'y	AK
52	NPLYV0147AJZZ	V	Reel Pulley Ass'y	AP
53	NGERH1224AJZZ	V	Playback Gear	AD
54	MLEVP0241AJZZ	V	Clutch Connect Arm	AB
55	MLEVP0242AJZZ	V	Take-Up Main Brake Ass'y	AK
56	MLEVP0249AJZZ	V	Take-Up Lock Lever	AC
57	MLEVP0244AJZZ	V	Supply Main Brake Lever Ass'y	AH
58	MSPRT0380AJFJ	V	Main Brake Spring	AB
59	NGERH1225AJZZ	V	Cassette Hausing Control Drive Gear	AD
60	PREFL1004AJZZ	V	Light Guide	AD
61	MLEVP0250AJZZ	V	Slow Brake Ass'y	AD
62	MSPRT0383AJFJ	V	Slow Brake Spring	AC
63	RMOTN2051GEZZ	J	Capstan Motor	BD
64	RMOTM1062GEZZ	J	Loading Motor	AP
65	QCNW-0156AJZZ	V	Lead Wire for Loading Motor	AE
66	QCNW-0155AJZZ	V	FFC for Audio/Control	AF
67	QCNW-0157AJZZ	V	FFC for Drum Motor	AF
68	PSPAZ0434GEFW	J	Preload Collar	AL
69	LX-XZ3032GEFP	J	Preload Collar Mounting Set Screw (M4 + 5WP)	AC
70	PGiDC0052GEFW	J	Drum Base	AK
71	XBPSD30P08J00	J	Drum Base Mounting Screw (SW3P + 8S)	AA
72	QBRSK0034GEZZ	J	Drum Earth Brush	AD
73	MSPRC0194GEFJ	J	Drum Earth Brush Spring	AA
74	RMOTP1116GEZZ	J	Drum Drive Motor	BF
75	XBPSD26P06J00	J	Drum Drive Motor Mounting Screw (SW2.6P + 6S)	AA
76	DDRMW0015TEX1	V	Upper and Lower Drum Ass'y	

—— End of Mechanism Chassis Parts ——

Ref. No.	Part No.	★	Description	Code

CASSETTE HOUSING CONTROL PARTS

300	CHLDX3070TEV0	V	Cassette Housing Control Ass'y	AZ
301	LHLDX1024AJ00	V	Frame (L)	AG
302	LHLDX1025AJ00	V	Frame (R)	AG
303	NGERR3003AJFW	V	Drive Angle	AE
304	NGERR1005AJZZ	V	Double Action Rack	AC
305	MSPRT0381AJFJ	V	Double Action Spring	AC
306	MSLiF0070AJFW	V	Slider	AH
307	LHLDX1026AJ00	V	Holder (L)	AD
308	MLEVP0246AJ00	V	Proof Lever (L)	AB
309	MSPRD0150AJFJ	V	Proof Lever (L) Spring	AB
310	LHLDX1027AJ00	V	Holder (R)	AD
311	MSPRP0159AJFJ	V	Cassette Spring	AD
312	MLEVF0424AJFW	V	Proof Lever (R)	AC
313	MSPRD0151AJFJ	V	Proof Lever (R) Spring	AB
314	NGERH1226AJ00	V	Drive Gear (L)	AD
315	MSPRD0152AJFJ	V	Drive Gear (L) Spring	AC
316	NGERH1227AJ00	V	Drive Gear (R)	AD
317	MSPRD0153AJFJ	V	Drive Gear (R) Spring	AC
318	NGERH1228AJ00	V	Synchro Gear	AC
319	NSFTD0036AJFD	V	Main Shaft	AG
320	LANGF9570AJFW	V	Upper Plate	AH
321	MLEVP0247AJ00	V	Door Open Lever	AC
322	MLEVP0248AJ00	V	Sensor Lever	AB
323	MSPRT0382AJFJ	V	Sensor Lever Spring	AB
324	XHPSD30P06WS0	J	C3P + 6S (for Cassette Hausing Control)	AA
325	PSPAH0008AJ00	V	Spacer	AB

—— End of Cassette Housing Control Parts ——

SCREWS, NUTS AND WASHERS

200	LX-XZ3030GEFD	J	Set Screw	AC
201	LX-BZ3095GEFD	J	Audio/Control Head Screw	AA
202	LX-BZ3096GEFD	J	Tilt Adjusting Screw	AA
203	XBPSD26P06000	J	Azimuth Adjusting Screw (2.6P + 6S)	AA
204	XHPSD26P08WS0	J	Screw, C2.6P + 8S (For FE Head)	AA
206	XBPSD30P04J00	J	Screw, SW3P + 4S (For Loading Motor)	AA
207	XHPSD26P06000	J	Screw, 2.6P + 6S (For Capstan Motor)	AA
208	XHPSD26P06WS0	J	Screw, C2.6P + 6S (For Loading Motor Angle Ass'y)	AA

Ref. No.	Part No.	★	Description	Code

SCREWS, NUTS AND WASHERS (Continued)

209	XHPSD30P08WS0	J	Screw, C3P + 8S (For Drum Base)	AA
210	LX-NZ3046GEFW	J	X-Position Adjusting Nut	AB
211	LX-NZ3019GEZZ	J	Reverse Guide Adjusting Nut	AB
212	XNFSD40-31000	J	Audio/Control Head Adjusting Nut (M4)	AB
213	XNFSD20-16000	J	S.I. Roller Adjusting Nut (M2)	AA
214	XWHJZ52-05110	J	Washer, W5.2P-11-0.5 (Reel Height Adj.)	AB
215	XWHJZ52-03110	J	Washer, W5.2P-11-0.3 (Reel Height Adj.)	AB
216	XWHJZ52-04110	J	Washer, W5.2P-11-0.4 (Reel Height Adj.)	AB
217	XWHJZ52-06110	J	Washer, W5.2P-11-0.6	AB
218	XWHJZ52-07110	J	Washer, W5.2P-11-0.7	AB
219	XWHJZ31-02070	J	Washer, W3.1P-7-0.25	AA
220	LX-WZ1073GE00	J	Cut Washer, CW4.5P-11-0.5	AB
221	LX-WZ1006GE00	J	Cut Washer, CW2.6P-5.4-0.5	AA
222	LX-WZ1041GE00	J	Cut Washer, CW2.6P-6-0.5	AA
223	XRESJ40-06000	J	E-Ring, E-4	AA
224	LX-WZ1077AJ00	V	Bearing Fixed Washer t0.4 (Worm Gear THRUST PLAY Adj.)	AB
225	LX-WZ1078AJ00	V	Bearing Fixed Washer t0.5 (Worm Gear THRUST PLAY Adj.)	AB
226	LX-WZ1079AJ00	V	Bearing Fixed Washer t0.6 (Worm Gear THRUST PLAY Adj.)	AB
227	LX-WZ1080AJ00	V	Bearing Fixed Washer t0.7 (Worm Gear THRUST PLAY Adj.)	AB
228	LX-WZ1081AJ00	V	Bearing Fixed Washer t0.8 (Worm Gear THRUST PLAY Adj.)	AB

—— End of Screws, Nuts and Washers ——

Ref. No.	Part No.	★	Description	Code

MECHANICAL PARTS

601	CCABA3090TEV2	V	Top Cabinet Ass'y	
602	GCABB1143AJZZ	V	Main Frame	AT
603	GCOVA1830AJZZ	V	Antenna Terminal Cover (VC-M40B)	AH
603	GCOVA1831AJZZ	V	Antenna Terminal Cover (VC-MA48D)	
604	PFLT-0016AJZZ	V	Foot Felt	AB
605	XEBSD30P12000	J	Screw	AA
606	XEBSD40P12000	J	Screw	AA
607	XHPSD30P06WS0	J	Screw	AA
608	XESSF30P12000	J	Screw	AA
609	PSPAZ0390AJZZ	V	Spacer	AC
610	PSLDM4449AJFW	V	Head Amp. Shield (Top)	AD
611	PSLDM4450AJFW	V	Head Amp. Shield (Bottom)	AD
612	LANGQ9054AJFW	V	Earth Angle	AF
613	PSPAZ0456AJZZ	V	Spacer	AA
614	LHLDZ1909AJZZ	V	Tuner Holder	AD
615	LANGQ9055AJFW	V	Conv. Earth Angle	AD
616	LX-HZ3030GEFF	J	Screw	AA
617	PSLDM4469AJFW	V	FFC Shield	AD
618	LHLDP1143AJZZ	V	LED Holder	AD
619	TLABM2755AJZZ	V	Model Label (VC-MA40B)	
619	TLABM2756AJZZ	V	Model Label (VC-MA48D)	
620	PSPAZ0453AJZZ	V	Spacer	AC
621	LHLDZ1746GEZZ	J	Converter Holder	AB
622	XWHSD32-05100	J	Washer	AA

—— End of Mechanical Parts ——

Ref. No.	Part No.	★	Description	Code

FRONT PANEL PARTS

501	CPNLC1840TEV0	V	Front Panel Ass'y (VC-MA40B)	
501	CPNLC1840TEV1	V	Front Panel Ass'y (VC-MA48D)	
501-2	JBTN-2575AJSE	V	Button, Power	
501-3	JBTN-2576AJSA	V	Button, Channel	AE
501-4	JBTN-2579AJSE	V	Button, TV/VCR	
501-5	HDECQ1166AJSA	V	Front Decoration Window (VC-MA40B)	AN
501-5	HDECQ1256AJSA	V	Front Decoration Window (VC-MA48D)	
501-6	HDECQ1167AJSA	V	Cassette Flap	
501-7	HBDGB1008AJSA	V	Badge, "SHARP"	AE
501-8	MSPRD0103AJFJ	V	Cassette Spring	AB
501-9	TLABZ1094AJZZ	V	Feature Label (VC-MA40B)	
501-9	TLABZ1093AJZZ	V	Feature Label (VC-MA48D)	
501-10	JKNBK1079AJSC	V	Dial	
501-11	CBTN-2577TEV2	V	Button Ass'y	
501-11-2	LHLDZ1891AJZZ	V	Button Holder	
501-12	JBTN-2578AJSD	V	Button, Play	
501-13	HDECQ1138AJSC	V	Foot Decoration	

—— End of Front Panel Parts ——

SUPPLIED ACCESSORIES

ACCESSORIES

	QCNW-2702GEZZ	J	75ohm Coaxial Cable	AK

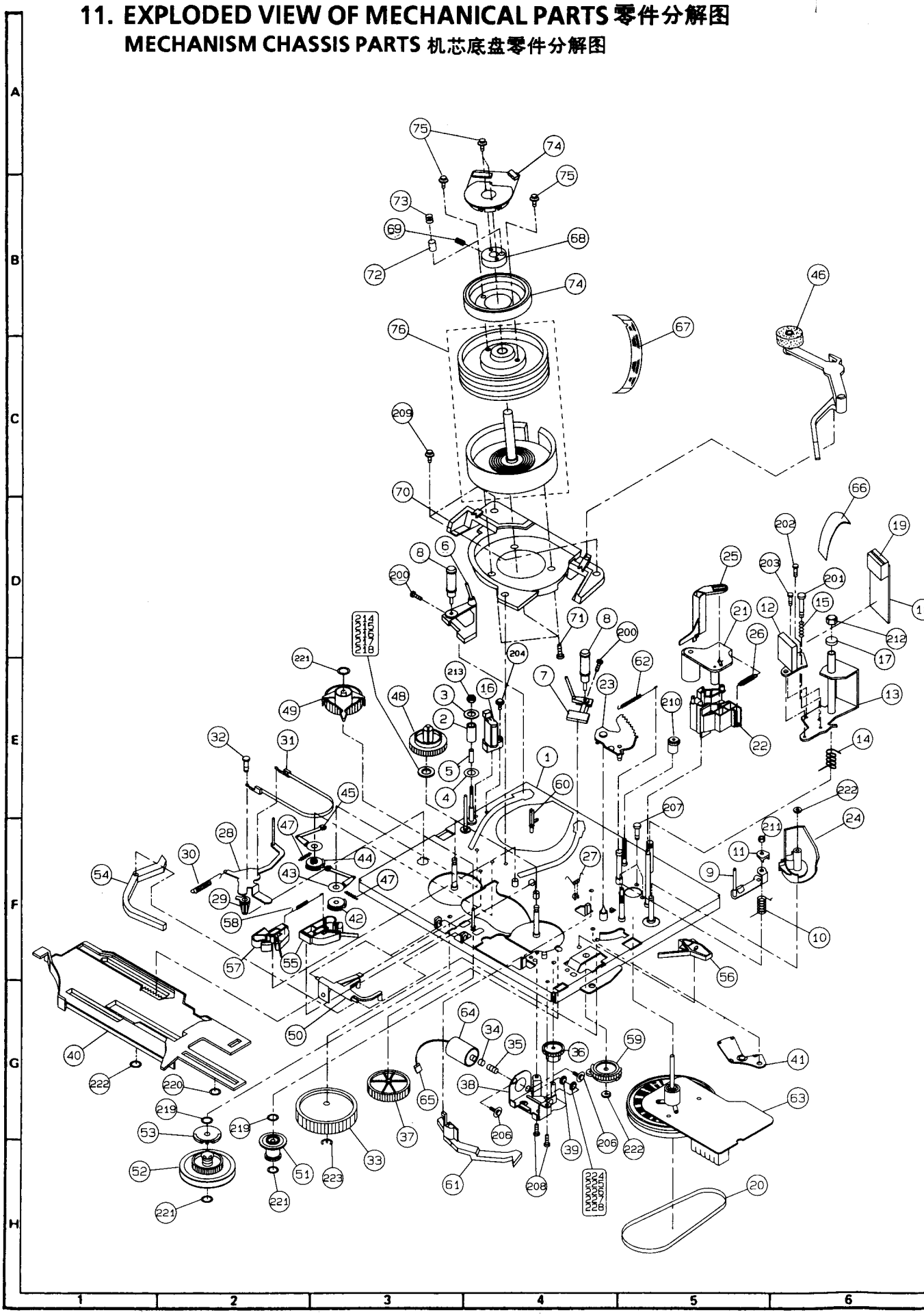
ACCESSORIES (NOT REPLACEMENT ITEM)

	TCADS3001PEZZ	-	SS-List (VC-MA48D)	—
	TINS-2308AJZZ	-	Operation Manual (VC-MA40B)	—
	TINS-2309AJZZ	-	Operation Manual (VC-MA48D)	—

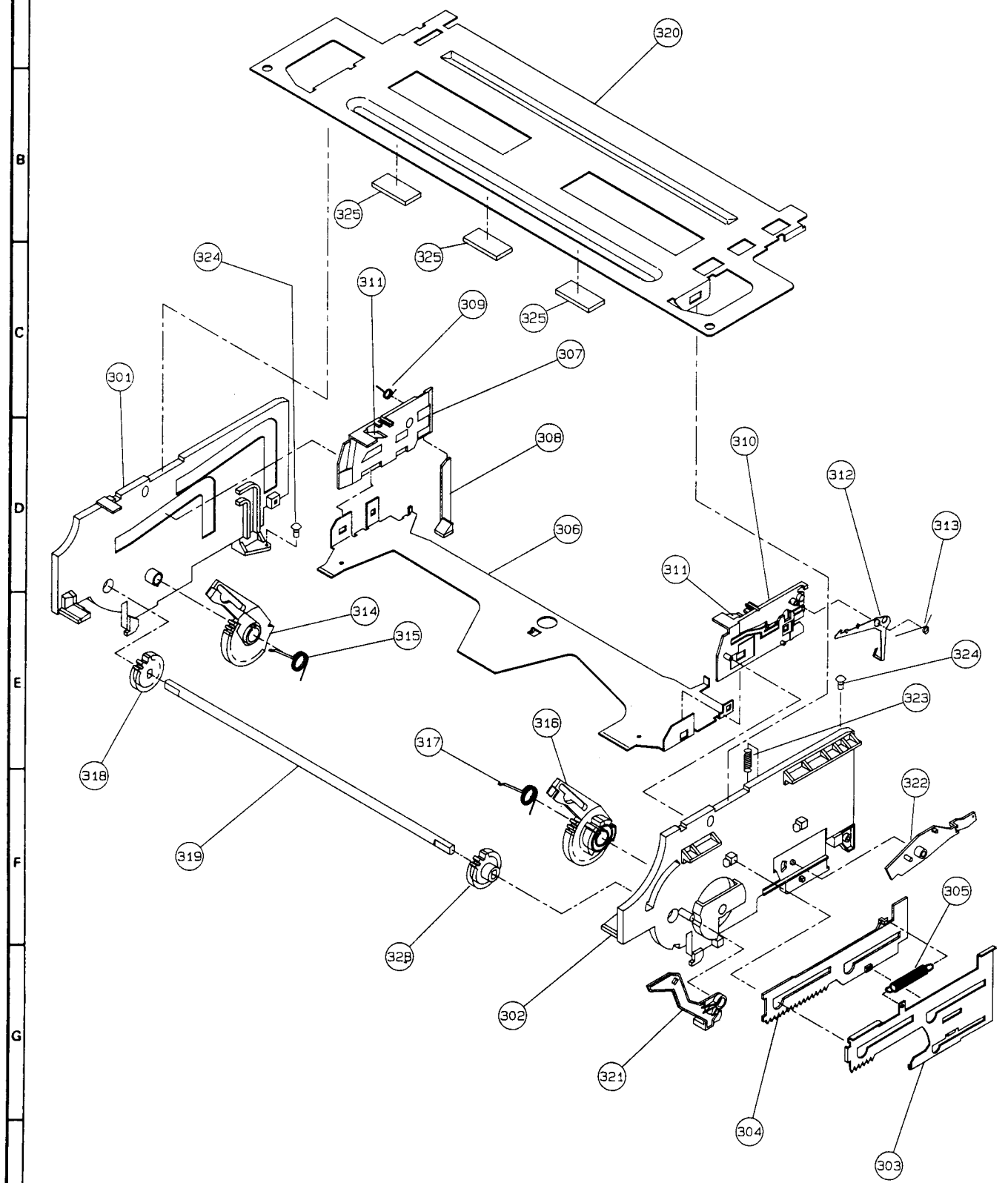
—— End of Supplied Accessories ——

11. EXPLODED VIEW OF MECHANICAL PARTS 零件分解图

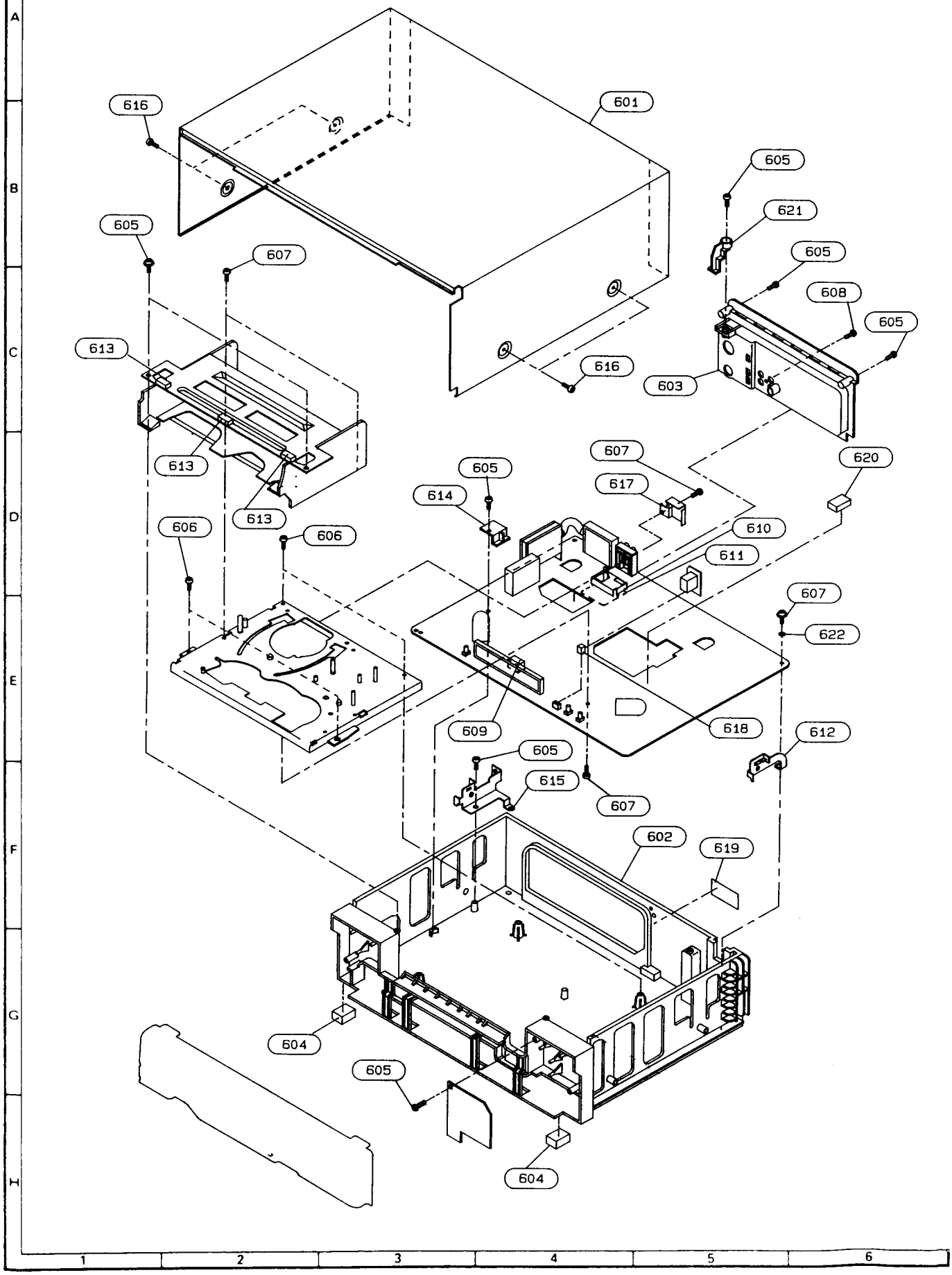
MECHANISM CHASSIS PARTS 机芯底盘零件分解图



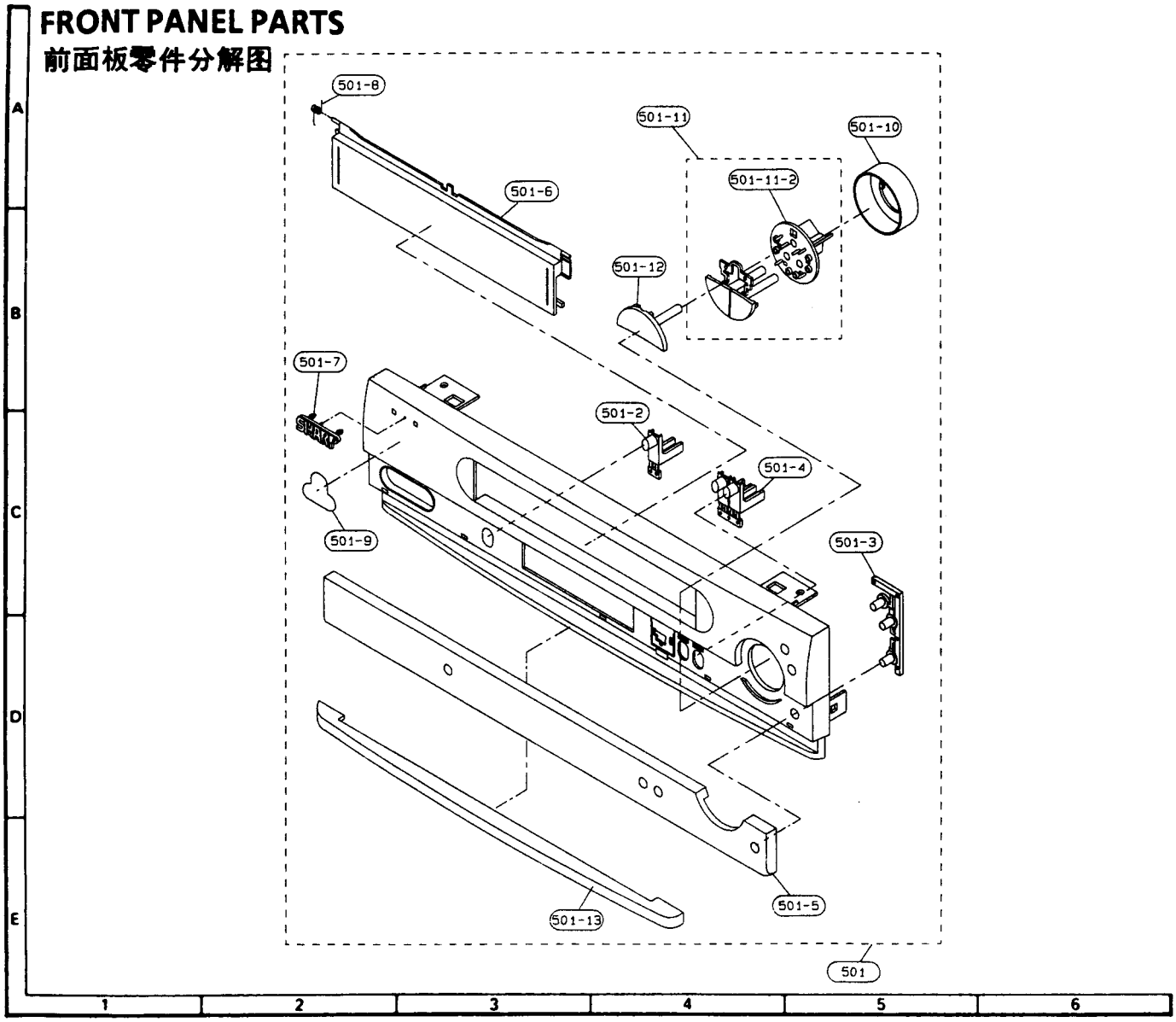
CASSETTE HOUSING CONTROL PARTS
盒室机构控制零件分解图



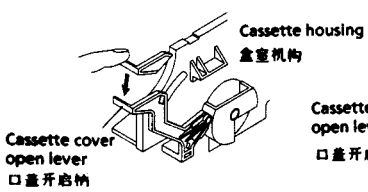
MECHANICAL PARTS
机械零件分解图

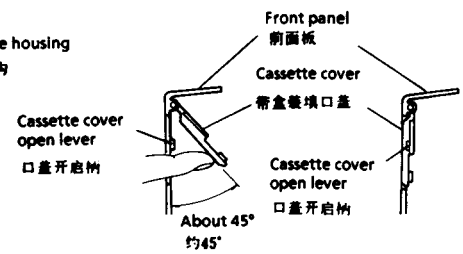


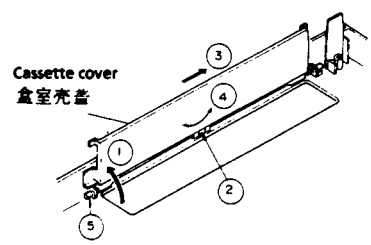
FRONT PANEL PARTS
前面板零件分解图



PRECAUTIONS ON FRONT PANEL SET-UP
前面板装配时的注意事项







Before attaching the front panel in position, make sure that the cassette cover open lever is in its right place (lowermost). If it is out of position, push it down with a finger.

安置前面板就位之前，必须先检查口盖开启钠是否置于正当位置（最下位置），否则，用手指向下按压口盖开启钠。

Keep the cassette over about 45° open and make sure that the cassette cover open lever is between the front panel and the cassette cover. Now fix the front panel in place.

保持将带盒装填口盖开启为约45°的状态，然后确认口盖开启钠位于前面板与带盒装填口盖之间，这样便可将前面板安装在规定位置上。

Do not mount the front panel with the cassette cover tilted too open. Otherwise the cassette cover might wrongly run on the cassette

带盒装填口盖开启度过大时，切勿安装前面板，否则装填录像带于盒室机构内时，会导致其口盖开闭动作不当。

Removing the cassette compartment cover.
① Open the cassette compartment cover fully.
② Remove the center positioner.
③ Slide the cover to the right.
④ Slightly bend the cover.
⑤ Draw out the left-side rod.

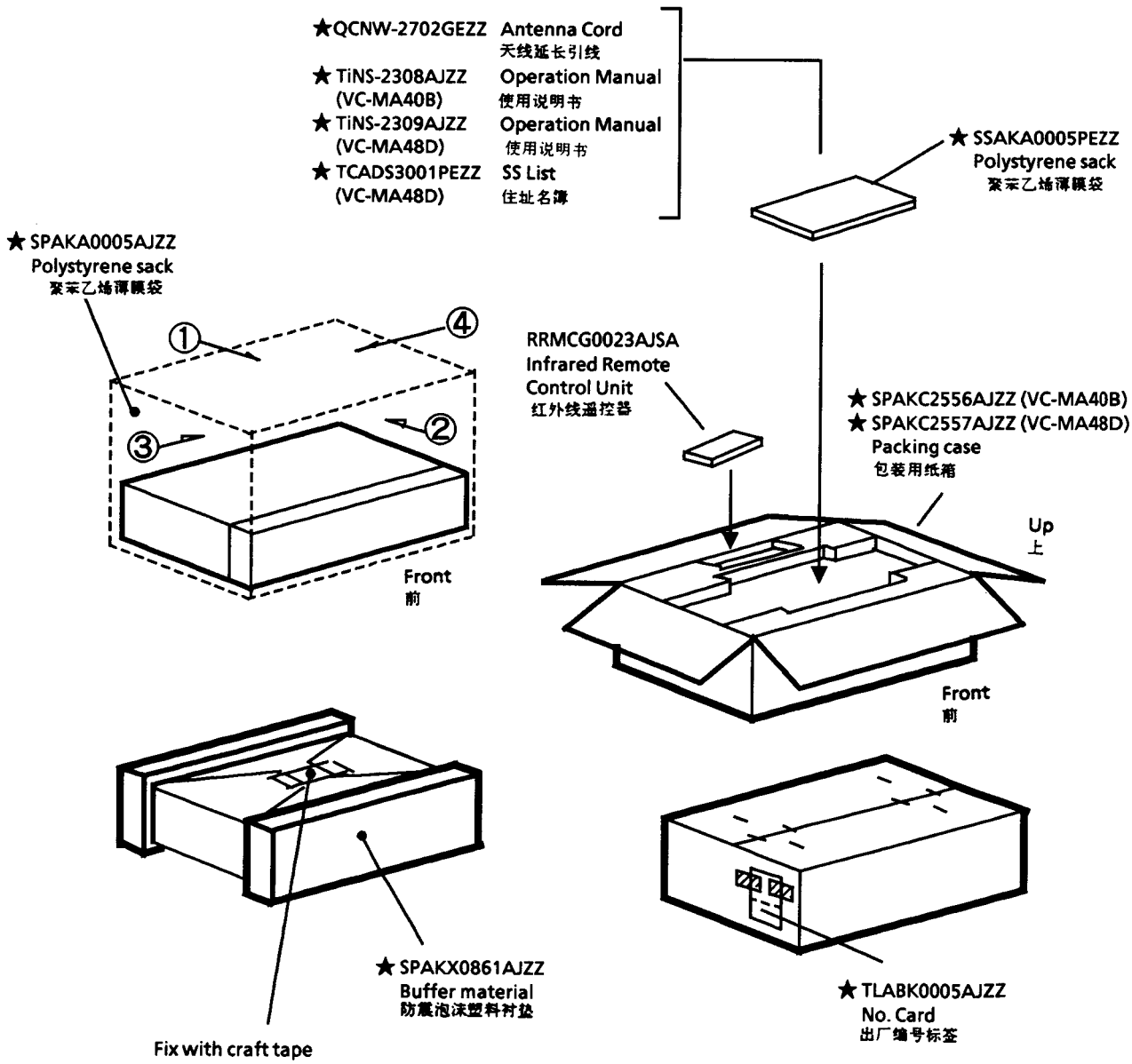
盒室壳盖的拆除
①完全打开盒室壳盖。
②拆下中心位置控制器。
③向右方移动盒室壳盖。
④稍微把盒室壳盖倾斜。
⑤取出左侧杆。

12. PACKING OF THE SET
包装方法

● Setting position of the Knobs ● 各旋钮设定方法

Test signal	at "OFF" position
RF converter output (VC-MA40B)	at "E36" position
RF converter output (VC-MA48D)	at "E38" position
测试信号开关	"OFF"位置
射频变换器输出电路 (VC-MA40B)	频道为"E36"
射频变换器输出电路 (VC-MA48D)	频道为"E38"

★ Accessories
★附属品


★QCNW-2702GEZZ Antenna Cord 天线延长引线
★ TiNS-2308AJZZ Operation Manual (VC-MA40B) 使用说明书
★ TiNS-2309AJZZ Operation Manual (VC-MA48D) 使用说明书
★ TCADS3001PEZZ SS List (VC-MA48D) 住址名簿
★ SSAKA0005PEZZ Polystyrene sack 聚苯乙烯薄膜袋
★ SPAKA0005AJZZ Polystyrene sack 聚苯乙烯薄膜袋
RRMCG0023AJSA Infrared Remote Control Unit 红外线遥控器
★ SPAKC2556AJZZ (VC-MA40B)
★ SPAKC2557AJZZ (VC-MA48D)
Packing case 包装用纸箱
Up 上
Front 前
Front 前
★ SPAKX0861AJZZ Buffer material 防震泡沫塑料衬垫
Fix with craft tape 用胶带粘紧封牢
★ TLABK0005AJZZ No. Card 出厂编号标签

MARK ★Not Replacement Items
★记号者为非更换品目